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A MESSAGE FROM NAE4-HYPD'S JOURNAL OF EXTENSION LIAISON

Theresa M. Ferrari, PhD, Extension Specialist, Ohio State University Extension

Do You Know JOE?

As NAE4-HYDP's liaison to *JOE*, or the *Journal of Extension*, my role is to be sure that you know *JOE*. Thus, we have assembled this conference edition to showcase recent articles that were written by 4-H professionals and published in this year's Volume 59.

As NAE4-HYDP's liaison to the *Journal of Extension*, my role is a two-way street. In addition to making sure that you know *JOE*, I represent the interests of our association and its members to make sure that *JOE* knows *you*. In addition to NAE4-HYDP, the Extension Journal Inc. board of directors is composed of representatives of Extension's professional organizations and affiliate groups. As a board we are charged with publishing a journal that upholds rigorous scholarly standards. The work of the board is carried out though various committees, including the editorial committee for which I serve as chair.

Anniversaries are a time to pause and celebrate past accomplishments. As NAE4-HYDP celebrates its 75th anniversary this year, the *Journal of Extension* is preparing for an anniversary of its own: 2022 will mark the journal's 60th volume. What are some of *JOE*'s recent accomplishments? The year 2021 brought some big changes to the journal. These changes are explained in more detail in my editorial (Ferrari, 2020) and in my update that is linked to the June 2021 issue (Volume 59, Issue 2 https://tigerprints.clemson.edu/joe/ vol59/iss2/), but a few of the most important are highlighted below.

In 2021, we:

- Established a new publishing home at Clemson University Press and hired a new production editor
- Instituted a new publishing model that brought on nine associate editors (and we're looking for two more)
- Added DOIs (digital object identifiers) to articles, which conforms to contemporary publishing standards and makes them easier to locate
- Adopted the 7th edition of the American Psychological Association guidelines and consolidated journal-specific style guidelines

As I reflected on the recent transitions that *JOE* has experienced, I found myself wondering: What was Extension like in 1963 when *JOE*'s first issue was published? Perusing the inaugural issue, I found an article about the diffusion of innovations (Rogers, 1963)—in other words, the process of change. Our experiences during the pandemic have reminded us that change is constant, but the adage "the more things change, the more they stay the same" applies as well. The first 4-H-specific article published in the journal noted the need to understand factors influencing individual and group behavior and shared considerations for working with young people (Nelson, 1963). Isn't this topic relevant today too?

Anniversaries are also a time to look to the future. Now that you know *JOE*, be sure to introduce *JOE* to your colleagues who may not have met us. As stated at the outset, the goal of the journal was to keep in touch with new developments in Extension (York, 1963) and to promote the professional growth and competence of its readers (Stone, 1963), and that has not changed over time. York (1963) reminded us that

the journal is "only as good as we make it" (p. 8), and that advice holds true 59 years later. We hope that you will consult the journal for new ideas and consider it as an outlet for your future scholarly endeavors. As well, consider becoming a peer reviewer and, at some point in your career, serving in the role of associate editor.

You can find the journal at www.joe.org. As NAE4-HYDP's *Journal of Extension* Liaison, I am committed to "making the best better." Please reach out to me (ferrari.8@osu.edu) or our editor, Drew Griffin (journalofextension@clemson.edu), if you have any questions or concerns (and we'll take positive comments as well).

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Value of Assessing Personal, Organizational, and Community Impacts of Extension Volunteer Programs

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Abstract. Extension volunteers demonstrate personal, organizational, and community benefits. Our group of Extension professionals in the North Central Region applied these three levels of benefit to gather quantitative and qualitative data in a comprehensive evaluation of volunteer impact. Survey responses were received from 2,978 4-H youth development volunteers in 12 states. A mixed-methods approach, such as the one we used, can provide Extension professionals with evidence to communicate the value of volunteer programs and improve their practice in volunteer systems management.

INTRODUCTION

Extension

Extension relies on volunteers to design and deliver educational programs (Boyd, 2004; Vines & Anderson, 1976). Volunteer contributions make significant impacts on Extension as an organization and on the volunteers' communities. Volunteers also personally benefit from volunteering. The importance of their contributions, along with the level of staff investment required for managing volunteer systems, warrant application of time and resources to conduct an evaluation of volunteer program impact. Safrit (2012) asserted this:

Evaluation is critical, if not *the most* critical, component of managing an overall volunteer program and subsequently documenting the impact and ultimate value of the program to the target clientele it is designed to serve as well as the larger society in which it operates. (pp. 389–390)

In a review of evaluation studies published in the *Journal* of *Extension*, Workman and Scheer (2012) affirmed that we must document more than Extension participant numbers. Extension professionals must seek higher evidence of impact that shows change in practice and benefits to the community. Our ability to measure and evaluate the impact of volunteers can lead to additional support of volunteer programs and better programs (Adams et al., 2016; Meier, 2012). Providing relevant data to decision makers is important to build and maintain the support of Extension volunteer programs.

can apply findings to improve volunteer systems management practices that lead to stronger programs. Franz et al. (2014) called for a holistic approach to

Extension professionals who serve as volunteer administrators

evaluation that considers both the private (direct to users) and public (indirect to nonusers) value of Extension programs. A number of studies have illustrated that volunteering benefits the individual and the organization for which a person volunteers. Specifically, volunteers have reported personal growth, increased self-confidence, knowledge and skills gained, and satisfaction when influencing the organization's mission (Adams et al., 2016; Grant et al., 2020; Larson Nippolt et al., 2012; Lough et al., 2009). As well, organizations benefit from engaged volunteers who help fulfill their missions and positively affect program recipients (Grant et al., 2020, Larson Nippolt et al., 2012; Lough et al., 2009).

However, Franz et al. (2014) noted that we in Extension fail to gather evidence of the public value of most programs, which would contribute to comprehensive evaluation. Extension program staff have a responsibility to demonstrate public benefit because of public funding they receive (Kalambokidis, 2011). There is a lack of literature documenting the combined value of volunteering with Extension programs to the volunteer, organization, and community.

Extension professionals can use a comprehensive evaluation approach, which includes volunteer impact, to improve their volunteer systems and practices. According to Adams et al. (2016) measuring volunteer impact can lead to strategic changes that improve the volunteer program to grow the organization's capacity.

METHOD

Our research team designed the North Central Region 4-H Volunteer Impact Study to document the impact of volunteering on three levels: personal, organizational, and community. We gathered both quantitative and qualitative data to determine impact. According to Safrit (2012), "both types of data are important in documenting impact of volunteer programs" (p. 396). The use of both quantitative and qualitative methods often results in richer, more powerful, and more comprehensive data (Edwards et al., 2019; Garbarino & Holland, 2009).

We focused on the impact of volunteering with the 4-H youth development program in a 12-state region. Administering the study across states allowed for a broader study scope with a larger sample size. The study addressed the growing need to demonstrate impact by using data to tell the story of the private and public value of volunteers (Fruchterman, 2016). Using a study model that allows for gathering quantitative and qualitative data to examine multiple levels of volunteer impact has implications for advancing the assessment of Extension's volunteer programs. All Extension professionals can use what we learned to undertake similar studies and articulate the volunteer impact to a number of stakeholder groups: existing and potential volunteers, Extension staff, Extension administrators, and public decision makers.

MEASURE

We developed an online survey to measure (a) personal benefits 4-H volunteers reported gaining from their volunteer service, (b) organizational benefits 4-H volunteers have provided to Extension programs through their activities, and (c) public value to communities resulting from activities of 4-H volunteers. We defined the personal and organizational benefits indicators using a mix of past research studies, past evaluation efforts, and national and state 4-H logic models and volunteerism expertise of members of our team. To further define public value for our study, we worked with Dr. Nancy Franz, who is known for her work in the area of public value, to operationalize four main areas: stronger communities, better connected communities, improved health of communities, and increased civic involvement. We tested the validity of the survey instrument by having existing 4-H volunteers take the survey. Revisions were made on the basis of their feedback.

An introduction to each section provided the context we wanted the volunteers to consider when responding to the question set. The survey included 59 multiple-choice items, yes-no questions, Likert-scale-response items, and openended questions. For Likert scale responses, volunteers rated their level of agreement with each statement on a 1 to 4 scale as 1 (*not true*), 2 (*somewhat true*), 3 (*true*), or 4 (*very true*). Cronbach's alpha for scaled items was 0.95.

After volunteering with 4-H	Not true	Somewhat true	True	Very true	Not applicable
I built new relationships with youth.	0	0	0	0	0
I was a caring adult for youth.	0	0	0	0	0
I increased my ability to lead meetings.	0	0	0	0	0
I increased my confidence as a leader.	0	0	0	0	0
I increased my knowledge in a specific con- tent area(s).	0	0	0	0	0
I helped youth develop leadership skills.	0	0	0	0	0
I learned how to think from diverse perspec- tives.	0	0	0	0	0
I made a difference in the lives of youth.	0	0	0	0	0
I positively impacted the community in which I live.	0	0	0	0	0
I gained skills I can use when I volunteer in other settings.	0	0	0	0	0

Table 1. Sample Questions for Measuring Personal Benefits

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The personal benefits section focused on what volunteers reported as their benefits to volunteering with 4-H. Volunteers were asked to rate how true statements were on the basis of their personal experience. The benefits were organized around their experience, leadership, content knowledge, positive youth development, skill transfer to other settings, and impact on young people and their community (Table 1).

The extent to which 4-H volunteers directly affected the organization was assessed. We asked about time spent planning and working directly with youth, frequency of volunteering, and benefits to the program and youth (Table 2 and Table 3).

Because Extension is a public system, we were interested in the impact volunteering with Extension had on the greater community (Table 4).

Contact Samantha Grant, samgrant@umn.edu, regarding the full survey instrument.

SAMPLE

Twelve participating states sent enrollment records of their 2017–2018 4-H adult volunteers to Samantha Grant, the principal investigator. She randomly selected a sample size of 1,000 volunteers from each state. This sample size was calculated to create a 95% confidence level for avoiding sampling error (Reisman, 2000). We oversampled volunteers choosing non-White racial categories or Hispanic ethnicity to attempt to gather feedback from diverse 4-H volunteers. For most states, the diverse volunteer sample was not more

than 100 volunteers, so in sum, volunteers representing racial and ethnic diversity made up about 10% of the sample.

PARTICIPANTS

Of the 12,000 volunteers invited to take part in the study, 2,978 volunteers completed the electronic survey, for a 25% response rate. Participants identified their race as White (93%), other combinations (3%), Black (1%), Asian (1%), and American Indian (1%); 2% were undetermined. Ninety-six percent of volunteers described their ethnicity as non-Hispanic; 4% identified their ethnicity as Hispanic. Volunteer roles were widely variable, as states categorized roles in different ways. "4-H club leader" and "project/activity volunteer" were the most common responses. Volunteer length of service varied, with 7% having volunteered 1 year, 32% 2–5 years, 24% 6–10 years, and 37% 11 or more years.

PROCEDURE

The volunteers received an electronic survey through Qualtrics, an online survey platform. Samantha Grant served as the point of contact and was the only individual with access to identifiable data.

We used the tailored design method (Dillman, 2007) for the electronic survey in an attempt to increase survey responses. Specifically, we used an introductory email message to alert volunteers of their selection as a survey participant and to emphasize the importance of the evaluation. We also sent a personalized survey message with the first survey link

Table 2. Sample Questions for Measuring Organizational Benefits by Contributing Time and Resources

	Yes, I've done this	No, I haven't done this	NA
I taught youth new skills.	0	0	0
I recruited new volunteers to 4-H.	0	0	0
I solicited donations on behalf of 4-H.	0	0	0
I spoke about the value of the 4-H program.	0	0	0
I have volunteered for other Extension programs.	0	0	0

Table 3. Sample Questions for Measuring Organizational Benefits by Helping Youth Gain Vital Skills

	Not true	Somewhat true	True	Very true
Volunteers help make youth ready for future careers.	0	0	0	0
Volunteers help youth improve their decision making skills.	0	0	0	0
Volunteers help youth serve their communities.	0	0	0	0
Volunteers help to build youth leadership skills.	0	0	0	0

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Table 4. Sample Questions for Measuring Public Value

	Not true	Somewhat true	True	Very true
Volunteering with 4-H makes communities stronger.	0	0	0	0
Volunteering with 4-H contributes to better connected communities (improved community networks; expanded or deepened social, personal, and/or professional connections).	0	0	0	0
Volunteering with 4-H improves the health of communities (promoting physical and mental well-being of youth and adults in the community).	0	0	0	0
Volunteering with 4-H contributes to increased civic involvement (involvement in organizational or community decision making, voicing opinions to civic leaders).	0	0	0	0

and two personalized reminder emails over a 4-week period to volunteers who had not completed the survey.

DATA ANALYSIS

It was important for our team to hear the voices of volunteers through both quantitative and qualitative responses. We analyzed quantitative data using frequency analyses. To analyze the significant amount of qualitative data, we participated in a data jam led by the University of Wisconsin-Madison Division of Extension. A data jam is designed to build capacity in using digital tools to analyze qualitative data and to "produce concrete write-ups, models, initial theories, and visualizations through collaboration" (Schmeider et al., 2018, The Data Jam Initiative section, para. 2). Using multiple reviewers to analyze qualitative data was methodologically stronger because we could mitigate our biases (Schmeider et al., 2018).

The anchor question that guided our qualitative analysis was this: "As a result of being an Extension volunteer, how are communities impacted?" Using our anchor question, we generated and defined an initial set of codes. We used MAXQDA (VERBI Software, 2017) as our qualitative data analysis software package to organize, annotate, and sort the qualitative data (Schmeider et al., 2018).

Our team analyzed 25 unique responses from each state, for a total of 300 responses per question for overall analysis. We ensured each respondent was included at least once in the qualitative analysis. We established a pattern of coding a question, reflecting on the data, identifying potential new codes, and writing initial findings related to the themes. This method of constant comparison analysis as adapted by Lincoln and Guba (1985) allowed us to revisit data after initial coding until it was clear that no new themes were emerging. We developed anchor examples and notes for each code to create consistency in their use.

RESULTS

Our research team published another article (Grant et al., 2020) that discussed the personal and organizational benefits of volunteering in youth development organizations. We will repeat some data and provide additional data to illustrate the value of assessing personal, organizational and community benefits resulting from volunteering with Extension programs. Herein we share most frequent quantitative and qualitative responses for each level of value.

PERSONAL BENEFITS

Volunteers benefited from their service in many ways. The most frequent ways they indicated were that they were a caring adult for youths (96%), they had fun (95%), and they built new relationships with youths (92%). Analysis of the qualitative data revealed two top areas of personal benefit: (a) volunteers gained skills that can be used in other settings and (b) they further developed their interpersonal skills. One volunteer said, "I think my experience with 4-H volunteering has made me a better person in all other settings." Another said, "The main reason I got my current job is because of my experience in 4-H. My ability to guide 4-H meeting[s] made me able to facilitate classes and programs in my current position."

ORGANIZATIONAL BENEFITS

The extent to which 4-H volunteers directly affected the organization was assessed. Volunteers reported that they contributed time and resources to the Extension program. A majority (63%) volunteered with 4-H between one and three times per month. On average, 4-H volunteers spent 9 hr a month volunteering.

4-H youth development programs aim to be a place where young people learn, lead, and build meaningful

connections with adults. 4-H volunteers advanced this mission by teaching and mentoring youths and helping them gain valuable skills such as leadership (98%), giving back to the community (98%), decision making (97%), and career readiness (96%).

Volunteers shared qualitative examples of how they benefited 4-H and Extension. They served as liaisons between the 4-H youth development program and community partners. One of the most frequently mentioned benefits to the organization identified by volunteers was their ability to connect other organizations with Extension and make new connections in the community on behalf of 4-H. One volunteer noted, "Because 4-H involves several connected but separate groups . . . having people cross into multiple groups helps all groups learn and leverage the skills and focus of each individual group." Volunteers raised awareness with nonprofits, businesses, civic organizations, and other stakeholders about Extension's youth program. For example, one volunteer reported doing this by making people in the community "aware [of] the importance of youth growing into caring adults and [being] willing to give back to their communities."

PUBLIC BENEFITS

Because Extension is a public system, we were interested in the impact volunteering with Extension had on the greater community. 4-H volunteers responded positively that they made communities stronger (92%), linked communities through improved social and professional connections (89%), improved the physical and mental health of communities (81%), and increased civic involvement (78%).

The qualitative data, where volunteers shared examples, showed that the public benefited when 4-H volunteers provided service to communities. Volunteers described how they used skills they gained as 4-H volunteers with other community-based organizations. One stated, "4-H volunteers never seem to be involved in only 4-H. They are out in the community taking part in other volunteer activities and encouraging their 4-H members to pay it forward also." Volunteers shared how they leveraged financial resources to support local needs. One example was "working with the community advocating for our youth...It has been meaningful doing fundraising for local charities and helping students learn the importance of community." The public also benefited when volunteers took active leadership roles in their communities. A volunteer gave this example, "When our community held a forum to find out how the community could improve, 4-H volunteers were some of the first people asked to participate; they are seen as important as school leaders, government leaders and church leaders." They also talked about the value of networking in their communities, with one respondent stating, "The volunteers are working to link the community projects with 4-Her's [sic] to provide

community connection for the members and to provide resources to the communities."

DISCUSSION

Identifying personal, organizational, and community benefits results in a comprehensive view of the contributions of Extension volunteers. Using a mixed-methods approach provides evidence that can be used for communicating the value of volunteer programs to stakeholders and for improving staff practice in volunteer systems management.

COMMUNICATING VALUE

Possessing volunteer impact data allows for developing communication messages that can be tailored to a number of audiences, including potential and existing volunteers, government officials, Extension professionals, and Extension administrators. For each group, identifying key messages, channels for sharing the information, and the call to action or behavior change can lead to desired results. As an example, pairing volunteer images with study impact quotes can be effective in a social media recruitment campaign targeting potential volunteers.

Volunteers add value to their communities. They extend the reach of programs and give their time and resources to programs, leveraging the public dollars invested in Extension. Sharing these data-based public value messages with local and state government officials can leverage the financial support needed to sustain and grow Extension programs. We need to communicate the value of volunteer contributions, and the role of staff in leading volunteers so that Extension administrators are equipped with evidence to encourage Extension professionals to invest their time and organizational resources in volunteer development.

Craig and Borger (2019) reminded us that it does not really matter how data are collected or interpreted if our intended audiences cannot understand the results. Extension professionals should engage communication and public relations staff to help articulate the impacts of the volunteer program (Franz, 2009). These skilled colleagues can assist with the development of a communications plan and products that may include social media resources, email messages, infographics, and reports.

Our study showed that volunteers were critical ambassadors of the 4-H program. Future efforts should consider how to engage volunteers to develop and share public value messages. They can speak authentically to stakeholders about their volunteer experience. Franz (2009) shared a model of training volunteers in Cooperative Extension to be engaged in program evaluation and impact reporting. She further asserted that involving volunteers in this aspect of the work builds a sense of program ownership that contributes to volunteer retention.

IMPROVING VOLUNTEER SYSTEMS MANAGEMENT

Extension professionals can use impact findings from all three levels we studied—personal, organizational, and public value—to improve their volunteer systems management practices as effective volunteer systems rely on leadership of skilled Extension staff (Seevers et al., 2005; Washburn, 2017). Practices include identifying and selecting volunteers, providing appropriate orientation and training, engaging volunteers in meaningful roles, and recognizing and evaluating volunteer contributions (Boyce, 1971).

When recruiting volunteers, staff should name the personal benefits volunteers are likely to receive. In youth programs, messages about the positive interactions volunteers will have with youth and how they make a difference in the lives of young people will help attract individuals to volunteer roles. In another example, Newberry and Israel (2018) found that master naturalist program marketing messages to potential volunteers should center around the prospects of learning and helping the environment.

As volunteer role descriptions are developed, including impact statements that show the possible benefits to the volunteer, Extension clientele, and the public is important. For example, such descriptions should let 4-H volunteers know they will help youths gain new skills, make a positive difference in the lives of young people, have the potential to gain technical skills that are transferable to professional work environments, and make connections in their community.

Volunteers who feel they contribute to the mission of an organization generally are more satisfied and more likely to continue to volunteer (Blum, 2008). As volunteers are oriented to an Extension program, staff should share how their efforts help meet organizational goals. It is useful to provide examples of how, in the case of 4-H, they play an important role in facilitating the mission of helping young people learn and lead and to highlight that they may be asked to serve as a liaison between the Extension program and the community.

Personal, organizational, and community impacts can be effective in recognizing volunteers. Messages such as "Thanks for having positive interactions with young people" or "You really shined in teaching the group new skills" or "Your connections with the community helped our program grow" address specific impacts of a volunteer's efforts.

A time for feedback, or evaluation, at the end of volunteer service provides the chance for volunteers to reflect on their role. Staff should refer back to impacts identified in the role description and ask volunteers whether they received the benefits they expected and whether there are other benefits that would be useful to include in future role descriptions.

CONCLUSION

Our study focused on 4-H volunteers, but the approach of communicating the impact of volunteers cuts across

Extension program areas. Replication of the study by others in Cooperative Extension can offer a national picture of the public value of Extension volunteers and elevate the importance of investing in Extension's volunteer programs. Public value data reflective of other Extension program areas in addition to 4-H youth development are needed. Using our initial questions around personal and organizational benefits as a guide, Extension professionals involved in programs beyond 4-H youth development could adapt questions to reflect their specific programs. The public value questions are inclusive of all program areas.

There is a richness in assessing and communicating the personal, organizational, and community value of volunteer contributions. There is an urgency for stakeholders to understand the public value Extension volunteers bring to their communities. Considering a combination of quantitative and qualitative data paints the most comprehensive picture of impact to date. Research on how the beneficiaries of Extension's volunteer programs (e.g., 4-H youth, community members, families) value the efforts of volunteers would add to the ever-important evidence and story of impact.

Extension volunteers are making an impact, as summed up by a volunteer who participated in our study: "4-H volunteers working with kids and building relationships with them will have a long term impact on that youth. Youth who are engaged by a caring adult will go on to have successful relationships in other areas of their lives benefiting the community."

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4-H Engineering Design Challenge Program: Engaging Youth in STEM Learning

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JOURNAL OF

Abstract. The University of Minnesota 4-H Engineering Design Challenge program is an experiential learning opportunity in which youth work with adult volunteers to create Rube Goldberg influenced machines to address real-world issues. The program components are designed to help youth develop STEM work skills using an Engineering Design Process, increase interest in STEM content knowledge, and explore STEM career interests/aspirations. Evaluation indicates a majority of participants learn the engineering design process, principles of mechanical engineering, teamwork, public speaking, and problem solving. Programmatic outcomes and supports provide for the successful replication, adaptation, and implementation in both formal and non-formal learning environments.

INTRODUCTION

The University of Minnesota 4-H Engineering Design Challenge (EDC) program engages youth in problem solving as they design and create a Rube Goldberg-influenced machine. Youth practice an engineering design process, increase interest in STEM content knowledge, explore STEM career interests/aspirations, and develop STEM work skills.

Research suggests that nonformal/out-of-school educational settings, such as 4-H, are important to address science, technology, engineering, and math (STEM) learning needs (Bell et al., 2009; Krishnamurthi et al., 2014; Meyer et al., 2010; Smith et al., 2004). Extension, including 4-H, plays a vital role in educational reform that excites and trains a diverse, next-generation STEM literate workforce (Meyer et al., 2014; Heck et al., 2012; Kraft, 1999). Educators have mobilized at the national and state level to meet the call to increase youth interest and achievement in STEM fields. Minnesota 4-H decided to prioritize engineering design, creating a new program that aligns with the Next Generation Science Standards (Minnesota Standards: Science K–12, 2009; National Research Council, 2013).

PROGRAM DESCRIPTION

The EDC program is an intensive learning experience of limited duration (two to six months). Youth in grades three through twelve work in teams of three to ten to design and create a multi-step machine. EDC machines use a series of chain-reaction steps that culminate in accomplishing a two-step task connected to solving a real-world issue. The program continues to evolve since its beginning in 2014; see Table 1 for examples of recent challenges.

The program offers a Level 1 and Level 2 option for teams. In Level 1, teams create machines using mechanical engineering. In Level 2, machines must include four types of engineering including mechanical, chemical, electrical, and fluid power. All teams use simple machines, including inclined planes, levers, wedges, wheels and axles, pulleys, and screws to create their machines.

In the EDC program, youth use an engineering design process model as a step-by-step approach to learning (Figure 1). This is a decision-making process, typically iterative, in which the basic science, math, and engineering concepts are applied to develop optimal solutions to meet a determined objective (Mangold & Robinson, 2013). The engineering design process incorporates a design cycle process model as outlined in the Next Generation Science Standards.

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Table '	1. Minnesota	4-H	Engineering	Design	Challenge Tasks	
				<u> </u>	0	

Challenge Year	Task
2020	Land a spacecraft on Mars and collect a sample off the surface.
2019	Remove pollution from water and place in an appropriate container.
2018	Plant a seed and water it.

4-H ENGINEERING DESIGN PROCESS

Age Age of the output of t

Figure 1. Engineering design process model. Adapted from North Carolina State University and Museum of Science Boston's "Engineering is Elementary" program.

Teams of youth document and communicate their learning to others in a public conference judging setting in their county or during an annual state showcase event. At the state event, youth present their machines to other teams, participate in STEM learning sessions, tour a university campus, hear from engineering faculty, and learn about career opportunities from STEM professionals. In addition, teams recognize peers for special awards honoring creativity, problem solving, and teamwork.

PROGRAM SUPPORTS

The program recruits adult volunteers from local communities to serve as team coaches. Coaches guide teams as they apply an engineering design process to create their machine, helping youth learn content and develop teamwork and problem-solving skills. They support teams as they share their knowledge and showcase their machines.

To support coaches, Minnesota 4-H provides a volunteer role description and online resources, which include a clear program description, machine building specifications, and curriculum. We conduct personal phone calls during the program cycle to offer feedback, provide guidance and answer questions.

We developed an EDC curriculum to facilitate a learning process that incorporates the practices of science and engineering. Coaches used the curriculum to engage youth in engineering content (types of energy, energy transfer, simple machines). Learning activities allowed youth to identify engineering problems, provide solutions backed by evidence, and engage in oral presentations and machine exhibitions. For Level 2 teams, we developed a guidebook to help teams apply four types of engineering to their machines.

4-H Engineering Design Challenge Program: Engaging Youth in STEM Learning

PROGRAMMATIC OUTCOMES

We used a variety of methods to evaluate program design and outcomes. Initial program design improvements were completed based on evaluations from volunteer coaches and judges at the state showcase. Results showed youth learned STEM work skills including teamwork, problem solving, public speaking and critical thinking. Moreover, youth learned STEM content, including the engineering design process, simple machines, and energy transfer. Over half of the youth participants indicated they would like to study or pursue a career in engineering as a result of the EDC. For purposes of this article, we reference the 2019 evaluation results, which parallel prior years of evaluation data (Figures 2, 3, 4 and 5).



As a result of EDC, youth developed new skills in...

Figure 2. Coaches' perceptions of youth learning STEM work skills (N = 37).

As a result of EDC, youth learned...



Figure 3. Coaches' perceptions of youth learning of STEM content (N = 37).

As a result of EDC, youth...



Figure 4. Youth participants' reported learning (N = 92).

As a result of EDC, youth...



Figure 5. Youth participants' interest in engineering (N = 92).

CONCLUSION

The University of Minnesota 4-H EDC program is a highly engaging, experiential learning opportunity for youth to develop STEM work skills as they use an engineering design process to address an issue in a team environment, work directly with adult volunteers, showcase their learning, and connect to STEM careers. Programmatic outcomes and supports provide for the successful replication, adaptation and implementation of the EDC program in both formal and non-formal learning environments.

4-H Engineering Design Challenge Program: Engaging Youth in STEM Learning

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Empowering Teens to Make a Difference in Their At-Risk Community

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JOURNAL OF VIENSION

Abstract. When identifying problems and creating solutions that support the community culture of health, youths provide a unique perspective. This article describes how staff from Somerset County, NJ 4-H partnered with staff from Middle Earth, an at-risk youth service provider, to organize a group of teens who identified and implemented projects that affect the health and wellness of their community of Bound Brook, NJ. Extension professionals can replicate a sustainable and synergistic youth-adult partnership by creating the opportunities, making the initial connections within the community, and following the 4-H club model to ensure teens experience the essential elements.

INTRODUCTION

"What are you kids doing in this park?" an angry resident next door to the park demanded as students gathered measurements of the area. This comment reflected the frustration residents experienced with witnessing daily drug deals. This comment also solidified the students' resolve to invest in improvements to take back their neighborhood park within Bound Brook, a low-income Hispanic town in Somerset County, ironically, one of the wealthiest counties in New Jersey. This type of reaction inspired the Somerset County 4-H staff to team up with staff from Middle Earth, an at-risk youth service provider, to approach teens in the low-income community of Bound Brook (where over 65% of students receive free/reduced lunches) to identify and rectify evidence of a decaying community.

As 4-H professionals, we strive to organize teens into the types of youth/adult partnerships that researchers (Brennan, Barnett, & Baugh, 2007; Ilkiw, 2010; Jones & Perkins, 2005; Zeldin, McDaniel, Topitzes & Calvert, 2000) have proven to be effective in meeting their goals. Thus the 4-H /Middle Earth Students Ambassadors for Community Health (SACH) club was formed. The SACH club started with a grant from Robert Wood Johnson New Jersey Health Initiatives. Middle Earth recruited teen members who live in Bound Brook and have never participated in 4-H. Teens worked in partnership with the Bound Brook town council, police, other community organizations, and Rutgers University's Bloustein School of Planning and Public Policy (BSPPP) to learn about and solve community problems. The teens implemented self-designed projects to make their communities healthier and more vibrant. The teens were invested in this program as evidenced by the multiple finished projects SACH members have tackled over the past few years.

2018 PROJECTS

In 2018, ten SACH teens who were new to 4-H worked with the Bound Brook government to increase pedestrian safety by providing "high visibility areas." These are areas that passively slow drivers and enable pedestrians to cross safely in designated areas. In addition, they built a parklet (a moveable seating area that takes up two parking spaces) to use at township events. The SACH members successfully created the following projects:

- **Street Murals**—With guidance from a local artist, SACH members painted 5 large colorful street murals around Bound Brook, which passively slows traffic down.
- Crosswalk Murals—SACH members collected data about jaywalking, distracted driving, vehicles yielding to pedestrians and cyclists, and shared the information with local government officials. Based

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upon that data, they obtained approval to paint high visibility crosswalk murals within town. These brightly colored murals passively slow down traffic creating a safer crosswalk.

• **Parklet**—SACH members built a parklet, a temporary and movable seating structure that acts as an attractive sidewalk extension, providing more resting space for the public. The parklet can be quickly assembled and disassembled for transport and is roughly the size of two parking spaces. The teens assembled the parklet at many community events, giving residents an attractive place to stop, sit, and to rest while taking in the activities. The parklet continues to be used at 4-H, Middle Earth, and other county events.

2019 PROJECTS

In 2019, based on the success of the previous year, the four SACH members who did not age out, returned and eight new teens joined the project. They received permission from the Bound Brook town council to revitalize a park that had been neglected for years. The members:

- Petitioned to have the park renamed "Mariposa Park" (Spanish for butterfly) to symbolize the transformation of the park from a caterpillar into a beautiful butterfly.
- Partnered with a newly formed Community Garden Committee and added herb boxes and a vegetable stand to the community garden. They planted two peach trees and raspberry bushes so visitors could pick the fruit for free.
- Installed a grill, benches, picnic tables, and a Little Free Library. Sweet Reads, a local nonprofit that distributes books to children in underserved communities, donated the books.
- Painted a street mural and colorful crosswalks to passively slow down drivers.
- Installed a beautifully patterned pathway from the park's street entrance to the community garden.
- Offered classes at the park, such as food tasting, arts and crafts, and yoga, that were well attended by the community.
- Created a "Story Book Trail," a series of twelve 3D butterfly sculptures designed and painted by artists commissioned by the teens. Each butterfly features a metal podium containing a portion of a story about Maria the Mariposa discovering her life's purpose. The story, written in both English and Spanish, was authored and illustrated by the club members.
- Unveiled their hard work at a Mariposa Park block party where over 100 community members attended, including the mayor, members of the borough council, and a county commissioner who declared that the work they accomplished was "magic."

CONCLUSION

In this youth/adult partnership, youths were excited about taking ownership of projects which created a more vibrant and healthy community that has grown well beyond the New Jersey town of the Bound Brook. Zeldin, McDaniel, Topitzes, & Calvert (2000) described this excitement as a "synergy in terms of a new power and energy that propels decision-making groups to greater innovation and productivity." The success of the various projects tackled by this group since 2018 led to increased demand of youth/adult partnership community projects with neighboring communities. Extension professionals can replicate the success of their youth/adult partnerships by including the following aspects into their program planning:

- Create opportunities for teens to be a part of their community's health and wellbeing—this can be in the form of clubs, youths on boards, short term programming, or whatever design best fits your community.
- Make the initial connections with the appropriate agencies and organizations in the community so they are prepared when the teens contact them.
- Follow the 4-H club model so teens experience the essential elements (belonging, independence, generosity, mastery) while learning parliamentary procedure, public speaking skills, planning and organizational skills.

Empowering Teens to Make a Difference in Their At-Risk Community

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Using True Colors® to Match Individual's Personality Traits with the Appropriate Volunteer Role for Success

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Extension

Abstract. Just as there are different reasons that people volunteer in the community, each volunteer has specific values, different needs to be fulfilled, and different strengths to offer to Extension programs. Understanding these characteristics and utilizing them in assigning the appropriate volunteer role will result in more success in their volunteer experience. Utilizing True Colors[®] when assigning volunteer roles and developing working groups and committees has proven effective in our county 4-H programs. Conflicts between volunteers who do not work well together have been lessened due to reassigning them to roles that best fit their personality types.

INTRODUCTION

In our county programs, we have found that it is important to understand and identify the values, needs, and strengths of volunteers to ensure success in their roles within Extension programs. It is important to intentionally select volunteers for the roles to which they are best suited (Penrod, 1991). Just as there are different reasons that people volunteer, each volunteer has specific values they bring with them, different needs they want met in order to be fulfilled as a volunteer, and different strengths to offer Extension programs. In a descriptive study of volunteers in Ohio, Schmiesing, Soder, & Russell (2005) found that altruistic values motivated individuals more than the other aspects of volunteerism did. When Extension professionals understand these characteristics and utilize them in assigning appropriate volunteer roles, individuals can be more successful in their volunteer experience.

True Colors^{*}, a personality assessment instrument, is used to categorize personalities into 4 quadrants that foster an environment of understanding and collaboration. The assessment uses the colors orange, gold, green and blue to differentiate the four central primary personality types. Its methodology helps individuals to better understand themselves and how the different personality types interact. Understanding this dynamic can be helpful, especially when the success of an organization depends on the effective communication between and collaboration among its employees and volunteers (True Colors^{*}, 2020; Miscisin, 2001).

PERSONALITY TRAITS AND APPROPRIATE VOLUNTEER ROLES

An Extension professional versed in True Colors [®] can provide personality-specific insights to their volunteers. In reliability and validity testing, True Colors[®] showed considerable merit in precisely assessing and defining psychological types and temperament theory (Whitchard, 2013). According to True Colors[®] every person is a unique mix of these personality (color) traits with varying degrees of dominance. Moreover, the following descriptions and techniques provide general suggestions when assigning the best role to volunteers when the dominant part of their personality has been identified (True Colors, 2020; Miscisin, 2001.)

BLUE VOLUNTEERS

Individuals with a predominately "blue" personality value acceptance and belonging. They are people oriented, shy away from conflict, and are usually guided by feelings and emotions. They enjoy motivating and encouraging others. These volunteers like working in groups and easily cooperate with others. They are adaptable and can fit many roles within Extension programs, specifically those responsible for coordinating large groups and working with youth. Blue volunteers may not be as successful in positions that require dealing with conflict, such as an

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advisory council chair or fair chairperson. We have found that blue individuals may not be comfortable making decisions that could result in making others unhappy. The caring blue volunteer may clash with the more nonsense green volunteer.

ORANGE VOLUNTEERS

Individuals with predominately "orange" personality traits are spontaneous. They like informal environments, are creative, work well with others, are willing to take on challenges, and are confident and comfortable in new situations. These types of volunteers excel in working directly with youth, taking on tasks that require a lot of creativity, and managing tough situations, including those causing conflict. The orange volunteer can make things happen, will think outside the box, and thrives on change. They will challenge those who always try to stay "inside" the box. A predominately orange volunteer may struggle in positions that require adhering to structure, details, and routine. An orange volunteer may be an effective 4-H club organizational leader but may struggle with portions of that role that require attention to detail, reporting, and/or paperwork. The spontaneous orange volunteer may clash with the more planned-in-advance gold volunteer.

GREEN VOLUNTEERS

The predominately "green" volunteer thrives on knowledge and learning and has high standards for themselves and others. They value learning, and their interest in 4-H would primarily be helping youth learn, taking on intellectual challenges, or being the problem solver. Strong green people are more comfortable working independently but are okay with groups if these groups have a purpose. They do not deal well with small talk or gossip and would be best in a leadership position that encourages use of their unique problem-solving ability. Volunteers with a strong green personality do well in times of crisis and are best at dealing with situations rationally. The intellectual green volunteer may clash with the emotional blue volunteer.

GOLD VOLUNTEERS

Individuals with predominately "gold" personality like structure and being in control of groups or projects put in their charge. They thrive with routine and adherence to policies and procedures, and they are usually highly organized and value planning ahead. Gold volunteers easily handle projects that require a lot of planning and organizing. These volunteers are effective 4-H club organization leaders, advisory group officers, and fair or event planning chairpersons. Strong gold people are often assertive about their method of doing things and at times feel that their way is the only right way. At times, they do not work collaboratively with others. For example, we have seen two gold volunteers who run a 4-H club clash continually because both like to be in control and have specific ways of doing things. Sometimes, a stronger gold volunteer may challenge the authority of Extension staff. In this instance, finding roles for each volunteer in which they can have control within acceptable policy parameters and also feel "in charge" may lessen tensions. In addition to clashing with each other, gold personalities may also clash with adventurous orange individuals, whom they feel are disorganized.

CONCLUSION

Because personality conflicts can sour valuable volunteers, True Colors[®] is an excellent tool for being proactive in assigning volunteer roles and developing working groups/committees to avoid clashes that detract from being productive. We have used True Colors[®] successfully in our county programs for over 20 years and have found that conflicts between volunteers who do not work well together have been lessened due to reassigning them to roles that best fit their personality. We have found that matching personalities with volunteer roles is one effective way to enhance volunteer satisfaction within their roles and minimize conflict for the program overall.

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Using True Colors® to Match Individual's Personality Traits with the Appropriate Volunteer Role

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4-H Youth Development Programming in Indigenous Communities: A Critical Review of Cooperative Extension Literature

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Abstract. A literature review was conducted using the key words relating to Native American Youth and 4-H to assess the current state of 4-H youth programming serving First Nation/ Indigenous populations to inform future Extension initiatives. A systematic and qualitative review determined what level of focus the conducted programming efforts placed on broadly accepted elements of cultural identity as noted in the Peoplehood Model. A very small number of articles (N=13) were found pertaining to 4-H and Indigenous Communities. Fewer demonstrated emphasis on the peoplehood elements of language, place, traditional ceremony or calendars, and history. This work investigates a continuing inequity in 4-H PYD–both in service and reporting–and suggests some next steps for creating a more inclusive 4-H program for Native American/First Nation/Indigenous youth.

INTRODUCTION

By any metric, Indigenous youths are profoundly underserved in the United States. There are 573 federally recognized First Nations, populated by more than 2.9 million citizens (U.S. Census Bureau, n.d.). Approximately 32% are under 18 years of age (U.S. Census Bureau, n.d.). Yet Native youths generally represent a small percentage of 4-H club communities. For example, in Arizona, the 2019-2020 4-H year saw 151 youths self-identify as American Indian/Alaska Native (AI/AN), 3.21% of club membership (4HOnline, 2020). By comparison, the 2018-2019 Arizona Department of Education Indian Education Report noted 55,572 Indigenous youths-5% of the student body-enrolled in Bureau of Indian Education and Arizona schools in grades 3-12 (Arizona Department of Education Accountability & Research Division and the Office of Indian Education, 2019). In an effort to address this inequity, we have three main goals for this paper: (1) Determine the existing body of Extension literature detailing 4-H programmatic interactions with AI/AN communities through a systematic review; (2) critique these publications in terms of their inclusivity of First Nations peoples, using American Indian Studies (AIS) intellectual frameworks; and (3) recommend next steps toward a cohesive and culturally relevant framework for 4-H program design, assessment, and adaptation.

Evidence of successful 4-H programming initiatives with First Nations populations is sparse (U.S. Department of Agriculture [USDA], 2015). This is a publication—or

dissemination—issue and an institutional culture problem (Fields, 2020). Our critical review is focused on academic products—i.e., published articles. We recognize that, as with the literature, 4-H youth development professionals have underreported programmatic efforts. Positive and negative outcomes from these efforts must be shared to improve the efficacy of positive youth development (PYD). Extension professionals must create overt systems of feedback whereby we can learn and adapt to better serve Native groups. As marginalization of AI/AN communities was a systemic and intentional process (Feagin, 2013), so must be our response (Fields & Nathaniel, 2015).

NOMENCLATURE

A continual critique of language best practices must exist. "American Indian" and "Native American" are two of the most common names used to characterize Indigenous peoples throughout the United States (Yellow Bird, 1999). The U.S. Department of Agriculture and other federal agencies use the standardized language "American Indian/Native Alaskans (AI/NA)" (USDA, n.d.). The 4-H Access, Equity, and Belonging Committee (AEBC) American Indian/Alaska Native Champion Group recognizes the following terms to describe the Indigenous peoples of the United States: Native Americans, American Indians, Indigenous Americans, Alaska Natives/Native Alaskans, and, ideally, specific tribal names (4-H Access, Equity, and Belonging Committee, 2020). Yellow Bird argues that the diversity of culture and history in AI/AN groups is best described through the nomenclatures of "Indigenous peoples" or "First Nations peoples." The term "First Nations" promotes a recognition of inclusiveness, sovereignty, accuracy, and identity empowerment sought by Indigenous peoples of North America (Yellow Bird, 1999). While all the aforementioned terms are in general and professional usage, in this paper, we use the terms suggested by Yellow Bird (1999) and the AEBC and combinations therein that promote Indigenous sovereignty. In practice, this is complicated; it is important for Extension professionals to determine how the community they work in self-identifies to insiders and to outsiders—and use language specific to that context.

BACKGROUND

Engagement in high-quality 4-H programming increases a child's ability to "thrive" (Arnold, 2018; Arnold & Gagnon, 2021). Thriving youths achieve important developmental outcomes—i.e., academic motivation and achievement, social competence, personal standards, connection with others, personal responsibility, and contribution to others (Arnold, 2018).

Many frameworks are used within the field of PYD. Foundational models include the 5 C's (R. M. Lerner et al., 2003), Four Essential Elements (Brendtro et al., 1991; Kress, 2003), Eight Features of Positive Developmental Settings (Larson et al., 2004), Youth Program Quality Pyramid (Herman & Blyth, 2016), and the 4-H Thriving Model (Arnold, 2018). These frameworks emphasize social, physical, and emotional well-being as essential for positive outcomes. Elements common to all include belonging, supportive relationships, skill building and mastering, and safe environments. Integrating these elements into programming creates an environment capable of fostering PYD (Arnold & Gagnon, 2019).

Interestingly, some of the core methodology within 4-H PYD was derived from interpretations of Indigenous philosophy and adapted for 4-H (Kress, 2003). Generally attributed to Kress (2004), the Four Essential Elements (Belonging, Independence, Generosity, and Mastery, or BIGM) are directly taken from the much earlier model known as the Circle of Courage (Brendtro et al., 1991, cited verbatim in Kress, 2003). Here is an example (with the exception of "Indigenous") of language from this article that is now considered fundamental within 4-H: "In traditional [Indigenous] society, it was the duty of all adults to serve as teachers for younger persons. . . . [C]hildren were nurtured within a larger circle of significant others. From the earliest days of life, the child experienced a network of caring adults" (Brendtro et al., 1991, p. 6). Brendtro et al.'s early text relied heavily on Indigenous sources, ethnology, and anthropology. Kress's (2003) transfer has significantly affected the trajectory of 4-H club work by emphasizing PYD principles. Subsequent

references to BIGM in the field of PYD are typically made without mention of its relationship to Indigenous philosophy.

RECOGNIZING UNDERSERVED AUDIENCES

The 2014 National 4-H Leadership Meeting highlighted steps for developing programs with First Nations populations. Samuel and Hughes (2014) have suggested

- establishing cooperation and trust,
- identifying common challenges faced by underserved audiences,
- identifying best practices in reaching individuals,
- identifying/using technology available to locate/ serve populations with special needs,
- evaluating 4-H program delivery methods,
- exploring new models and reevaluating club models, and
- identifying ways to provide underserved populations with opportunities to thrive in 4-H.

A variety of pathways lead toward meeting the needs of underserved communities. Hiring and training a diverse group of 4-H professionals with the skills and desire to work with all youths is essential (Ewert & Rice, 1994; LaVergne, 2015a). Diversity within the volunteer base helps support diversity of youth experience. This directive is not simplethe recruitment and volunteerism dialogue needs to adapt and change with each individual or group. For example, National 4-H Council has published online resources for recruiting and supporting Latinx volunteers to grow 4-H programs and better serve Latinx youths (Erbstein et al., 2017; Vega et al., 2016). The two most promising suggestions are avoiding the word "volunteer" during recruitmentinstead using "help" or "helping"-and asking volunteers for short-term commitments as opposed to the long-term commitments that 4-H clubs usually seek (Hobbs, 2018). Such tool kits are essential resources for 4-H professionals and have great potential for adaptation and use with Indigenous communities.

Best practices and tool kits have not been established for Indigenous communities. However, some progress has been made—the 4-H AEBC American Indian/Alaska Native Champion Group is forming best practices for working with Native youths (4-H Access, Equity, and Belonging Committee, 2020). These suggestions inform a wide variety of efforts and are therefore quite general. As of now, the suggestions include the following:

- Respect and learn from community elders, for elder knowledge is essential.
- Adapt efforts to collectivist culture.

- Demonstrate reliability as a resource—people need to know that you are there to stay and will follow through.
- Recognize and respect the worth of everyone and everything.
- Express humility and recognize personal ignorance.
- Listen before talking.

Caring youth-adult relationships are improved by individuals who understand the traditions, values, and beliefs of First Nations peoples. It is critical that competencies of non-Indigenous adults working with AI/AN youths grow to accommodate these populations. Inclusive thriving outcomes can only be achieved with representation (Samuel & Hughes, 2014) across the 4-H organization (Fields, 2020).

MODELS FOR CRITIQUING 4-H SUCCESS WITHIN INDIGENOUS POPULATIONS

To our knowledge, 4-H professionals do not currently use any theoretical frameworks that are designed specifically to serve Indigenous communities. Our mandate as an organization to create high-quality PYD experiences for demographically representative youths necessitates that we put serious effort into creating, or identifying, relevant models for serving Indigenous communities. The Peoplehood Model is a widely accepted theoretical framework within AIS (Holm et al., 2003). It is an inclusive and dynamic matrix for describing Indigenous ways of being and knowing (Figure 1, Holm et al., 2003; Stratton &Washburn, 2008). Holm et al. (2003) have suggested that "peoples" generally have shared language, place, ceremonial cycle/calendar, and history. Each of these factors "intertwine[s], interpenetrate[s], and interact[s]," forming a basis for how a group relates and adapts to different contexts and environments (p. 13).

Holm et al.'s model has been used widely in applied and academic work. The model has structured research within AIS (e.g., Alfred & Corntassel, 2005; Ellasante, 2019; Hannel, 2015; Walking Woman, 2019) and analyses of Indigenous literature (e.g., Pexa, 2019; Stratton and Washburn, 2008). It has also been cited in research and professional publications on non-Indigenous minorities and marginalized communities (e.g., Ellasante, 2019) and informed the conversation around international First Nations sovereignty (e.g., Corntassel, 2003).

In this article, we use the Peoplehood Model to evaluate the cultural relevance of reported programming with AI/ AN youths. Our assumption is that programming should reflect a participant's identity and values. We accept that a primary tenet of 4-H programming must be the inclusion of



Figure 1. Characteristics of the labor market.

Note. Adapted from Holm et al., 2003. Holm et al. (2003) have argued that a people's language uniquely characterizes their world and how it is perceived. Place provides a setting for experience, memory, and history. Ceremony and traditional calendars mark symbolic and practical events and the passage of time. History is the story of these interactions and dialogues, a recording of the past and a guide for the future. These four elements interact to create the evolving experience that individuals and groups use to define self and culture (Basso, 1996; Holm et al., 2003). These elements can help frame 4-H efforts with Indigenous peoples.

difference and the formation of common experience between participants (Fields, 2020).

METHODS

Kahn et al.'s (2003) five steps to conduct a systematic review framed our research: (1) Frame the question, (2) identify relevant publications, (3) assess research quality, (4) summarize evidence, and (5) interpret the findings. Our first goal for this paper was to determine the existing body of Extension literature detailing 4-H Club level programming with First Nations communities. We did this through a systematic review of Extension literature. Second, we critiqued these publications in terms of their inclusivity of First Nations peoples by using the Peoplehood Model.

We systematically searched significant journals for Cooperative Extension and PYD. Search terms were determined prior to the beginning of the review (Table 1). All articles were closely examined to verify mention of "Tribal," "Native," or "Indian" in context with "4-H" or "youth." Any articles referencing youth programs and Indigenous populations were included.

We sorted resulting publications into three classifications: "Direct," "Indirect," and "No Direct." Direct articles relayed results of programming that directly served Indigenous youths. Indirect articles included Native youths in a program population, but the research relayed did not specifically target the AI/AN audience. No Direct publications mentioned AI/ AN youths but did not provide results of programming. Articles were qualitatively coded into the appropriate classification.

In addition, we used the Peoplehood Model to critique whether programs were reflective of a group's identity and values. Our approach determined whether articles directly or indirectly included the four core elements of Peoplehood that is, (1) language, (2) place, (3) ceremonial cycle or calendar, and (4) history (Holm et al., 2003). We conducted a systematic word search to determine whether phrases associated with the Peoplehood Model were present (Table 1). In addition, each article was qualitatively reviewed for inclusion of the Peoplehood elements. Publications with themes related to the four elements but described in different language were included. Results are summarized in discrete (Saldaña, 2015) categories for our systematic search and narrative for our qualitative analysis.

RESULTS

Thirteen articles referencing Indigenous youths were identified in the journals searched (Table 2). Five articles were classified as "Direct," meaning that they relayed results of programming that directly served Indigenous youths. Zero articles were coded as "Indirect," meaning that Native youths were included in a program population, but the research relayed did not specifically target the AI/AN audience. Eight articles were classified as "No Direct," meaning that they mentioned AI/AN youths without providing programming results.

Each journal article classified as "No Direct" is presented in Table 3 (n = 8). Also included is specific terminology present in each article, the source journal, and the topic being discussed when the search term is mentioned within the article.

Each journal article classified as "Direct" is presented in Table 4 (n = 5). Specific terminology present in each article, the source journal, and the topic are included.

Five of the 13 publications in our review included the Peoplehood Element search terms (Tables 2 and 5). Three

Table 1. Journals and Search Terms

Aspect of search	Details
Journal searched	Journal of Child and Family Studies (JCFS)
	Journal of Community Engagement and Scholarship (JCES)
	Journal of Extension (JOE)
	Journal of Human Sciences and Extension (JHSE)
	Journal of Youth Development (JYD)
Search terms	"Native American Youth and 4-H Positive Youth Development"; "Native American Youth and 4-H Youth";
	"Native American Youth and 4-H"; "Native American Youth"; "Tribal Youth and 4-H Positive Youth Develop-
	ment"; "Tribal Youth and 4-H Youth"; "Tribal Youth and 4-H"; "Tribal Youth"; "Indian Country and 4-H Positive
	Youth Development; "Indian Country and 4-H Youth"; "Indian Country and 4-H"; "Indian Country"; "American
	Indian Alaska Native and 4-H Positive Youth Development"; "American Indian Alaska Native and 4-H Youth";
	"American Indian Alaska Native and 4-H"; "American Indian Alaska Native"
Peoplehood element	"Language"; "Dialect"; "Land"; "Territory"; "Place"; "Ancestral"; "History"; "Sacred history"; "Shared history";
search terms	"Ceremony"; "Ceremonial cycle"; "Calendar"; "Traditional calendar"

4-H Youth Development Programming in Indigenous Communities

Article classification	Count of articles with search terms	Count of articles with Peoplehood-element search terms	Source journals
Total identified (N)	13	5	JOE, JYD, JHSE, JCFS, JCES
Direct	5	4	JOE, JCFS, JCES
Indirect	0	0	
No direct	8	1	JOE, JYD, JHSE

 Table 2. Summary of Articles by Classification, Search-Term Mentions, and Source Journal

Table 3. Articles With "No Direct" Content

Article	Source journal	Search terms present	Торіс
Hensley et al. (2007)	JOE	Native American Youth and 4-H	Belonging matters for all youths.
Barcelona & Quinn (2011)	JYD	Tribal youth and 4-H youth	The relevance of cultural competency in youth development is growing.
LaVergne (2013)	JOE	Native American youth; 4-H youth development	Professionals identified that lack of knowledge of the program was the biggest barrier for youths of color and disabilities.
Borden et al. (2014)	JOE	Tribal youth and 4-H youth	No specific reference to tribal youths.
Fox & LaChenaye (2015)	JHSE	Native American; 4-H youth development	Professional competencies for working across cultures.
LaVergne (2015b)	JYD	Native American; 4-H youth development	Professional competencies for working across cultures.
Lopes et al. (2018)	JOE	Indian Country and 4-H Youth	International 4-H program design.
Lewis et al. (2018)	JOE	Tribal youth and 4-H	No reference to Native American youths. Some youths of color identified feeling disconnected from their club as a contributing factor in dropping out.

Table 4. Articles With "Direct" Content

Article	Source journal	Search terms	Торіс
Alves (1993)	JOE	Native American; 4-H youth development	Culturally responsive lessons for Extension professionals serving tribal communities.
Aschenbrener & Johnson (2017)	JCFS	Native American; 4-H youth development	Using a strengths model to focus on strengths and assets.
Vettern & Flage (2018)	JOE	Native American; 4-H youth development	Mentoring and building relationships between tribal youths and caring adults in a youth-adult partnership yielded numerous intended and unintended outcomes.
Garbow et al. (2019)	JOE	Indian Country and 4-H Youth	Using storytelling to connect to cultural legends to intro- duce and teach financial concepts.
Jones & Skogrand (2015)	JCES	Native American; 4-H youth development	Caring adults and culturally relevant activities are key to working with Native youths.

of these did not focus on Indigenous identity as a core program factor, nor were specific mechanisms for assessment or programmatic success discussed (Alves, 1993; Fox & LaChenaye, 2015; Jones & Skogrand, 2015). The remaining two articles—Garbow et al. (2019) and Vettern and Flage (2018)—focused on Native culture as a primary program element.

Garbow et al. (2019) have discussed using traditional stories to teach financial management skills to Ojibwe youths and families. The authors have written, "For each lesson, the legend was shared orally or read individually, and questions were asked about the story. Financial activities and discussion followed sharing of the legend, allowing participants to make connections between the legend and targeted financial concepts" (2019, para. 5). Language, place, ceremony, and history were a central focus of the program, which hybridized responsible financial habits and significant Ojibwe stories and actions. Ritual, such as the Ojibwe Smudging Ceremony, was part of the program (Garbow et al., 2019).

Vettern and Flage (2018) have discussed culturally engaging programs in which youths took leadership roles in community activities and businesses. Indigenous youths had "opportunities for . . . engagement in local businesses or community organizations. Through endeavors such as working at Sioux Image [a youth printing company] or running the Red Gym of Dreams [a youth recreation center], youths realized the importance of these efforts to community development and saw the opportunity to make a difference" (Vettern & Flage, 2018, para. 22). The authors have suggested American communities. Finally, in the articles discussing culturally responsive programming, there is little connection to broader best practices. The single exception is arguably Vettern and Flage (2018).

DISCUSSION

The dearth of literature is problematic for the 4-H organization, as it strives to provide a high-quality youth development experience to all members (National 4-H Council, 2015). It is clear that we lack programmatic data and a broad strategy for PYD in Indigenous communities. Given the profound impacts that PYD can have in marginalized communities (e.g., Edwards et al., 2007; Guerra & Bradshaw, 2008; J. V. Lerner et al., 2009; R. M. Lerner & J. V. Lerner, 2013), this status quo is unacceptable. However, 4-H can better serve Indigenous communities in several concrete ways.

CONCRETE ACTIONS THAT 4-H PROFESSIONALS SHOULD TAKE

The most immediately achievable action is for 4-H professionals to publish on their programming. We are aware of several successful initiatives cited by the AEBC American Indian/Alaska Native Champion Group that have produced meaningful results (4-H Access, Equity, and Belonging Committee, 2020). These and similar efforts—successful or not—must be shared broadly. In deepening our academic knowledge base, we can better inform a cycle of designing,

Article classification	Article	Peoplehood elements present (yes or no)				
		Language	Place or territory	History	Ceremonial cycle or calendar	
Direct	Alves (1993)	Yes	No	No	No	
No direct	Hensley et al. (2007)	No	No	No	No	
No direct	Barcelona & Quinn (2011)	No	No	No	No	
No direct	LaVergne (2013)	No	No	No	No	
No direct	Borden et al. (2014)	No	No	No	No	
No direct	Fox & LaChenaye (2015)	Yes	No	No	No	
No direct	LaVergne (2015b)	No	No	No	No	
Direct	Aschenbrener & Johnson (2017)	No	No	No	No	
No direct	Lopes et al. (2018)	No`	No	No	No	
No direct	Lewis et al. (2018)	No	No	No	No	
Direct	Vettern & Flage (2018)	No	Yes	Yes	No	
Direct	Garbow et al. (2019)	Yes	Yes	Yes	Yes	
Direct	Jones & Skogrand (2015)	Yes	No	Yes	No	

 Table 5. Mention of Peoplehood Model Elements Search Terms by Article, Chronologically

Note. "Yes" is used to represent the presence of the Peoplehood Model characteristic in the journal article from a keyword search and from subsequent qualitative analysis. "No" means that there was no reference to the Peoplehood Model characteristic in the article.

assessing, and adapting programs to serve Indigenous peoples.

National 4-H Council's work on Latinx outreach has produced valuable tools for Extension. Similar work must be done to provide tools for 4-H Extension professionals and volunteers. We must also assess existing resources and adapt existing work to better guide our efforts with First Nations peoples.

Our programs need to be made relevant for all stakeholders. We found that place, language, history, and ceremonial cycles were rarely mentioned, yet their presence seemed to yield profoundly meaningful results (e.g., Garbow et al., 2019). The elements of the Peoplehood Model promote inclusion in addition to a positive sense of identity and cultural pride. We believe that this model has broader applications, not simply as a tool of critique but as a primary framework for 4-H program design and assessment.

BUILDING ON EXISTING 4-H PHILOSOPHY

The 4-H community has many similarities to the Peoplehood Model and to Indigenous philosophy (Brendtro et al., 1991; Kress, 2003). The language used in 4-H can be overwhelming to those unfamiliar or without the background. Participating families have often been a part of the 4-H community for three, four, or even five generations. Yet 4-H is a relatively young organization in comparison to hundreds or thousands of years of cultural memory, as is the case with Indigenous communities. However, these kinds of cultural themes are universally human. The potential for a common conversation, at least in part, already exists within 4-H culture.

Culture is essentially a means of incorporating new ideas. Each culture has rules for interaction, methods of including new people, and rationales for not doing so. These guidelines are the result of a hard-learned and much-repeated lesson of history: Communities that do not change—that do not bring in the ideas of outside groups—will cease to exist. This understanding is important. We can rationalize the reasons that programs do not work or that certain groups are hard to reach. This information is not useful. We must recognize where our philosophy comes from and create the dialogue to move the 4-H organization forward.

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Leadership Life Skills Development in 4-H Teen Leadership Programs

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Abstract. This study introduces a framework for 4-H leadership competencies and explores the relationship between 4-H leadership programs and participant leadership life skills development. Illinois 4-H members aged 15-18 completed an online survey about their 4-H experiences and skills. Participants reported local programs exhibited the characteristics in the leadership competencies framework. Members participating in leadership competency programs reported higher leadership life skills scores than those in other 4-H non-leadership-oriented programs. Females reported higher leadership life skills scores in comparison to males. However, spending more years in leadership programs was only related to a significant change in skills development for some participants.

INTRODUCTION

4-H programs follow the experiential learning model and operate with the view that members learn leadership skills by practicing leadership behaviors (University of Illinois Extension, 2012). Providing youths with opportunities to learn and practice skills in groups to increase leadership knowledge matches the broader literature of youth leadership (Conner & Strobel, 2007; Redmond & Dolan, 2016; van Linden & Fertman, 1998).

4-H provides many avenues to learn leadership skills. Some studies have documented the self-assessment of leadership life skills in 4-H members who attended leadership conferences and trainings (Leggette et al., 2013; McElravy & Hastings, 2014; Tassin et al., 2010). Other studies have evaluated the perceived leadership skills obtained from 4-H livestock-related events (Anderson et al., 2015; Davis et al., 2016). Scholars have also examined the perceived leadership life skills of 4-H members who completed specific leadership activities (Phelps & Kotrlik, 2007; Real & Harlin, 2006). However, few have studied the leadership skills development of 4-H members in long-term opportunities designed specifically to teach leadership skills.

Among various factors, the amount of time spent in 4-H opportunities has been found to influence leadership life skills development. Phelps and Kotrlik (2007) found that more years of 4-H participation were related to higher leadership skills development. Real and Harlin (2006) reported that 4-H members with additional leadership experience reported higher leadership skills. Boyd et al. (1992) found that increased participation in 4-H activities led to a slight increase in leadership skills.

Previous research on youth leadership had little consensus around a shared definition of youth leadership (Conner & Strobel, 2007). To provide shared terms and practices, the Illinois 4-H program created a framework that categorizes and defines 4-H leadership programs (Diaz et al., 2015). The framework outlines six competencies, including planning, promoting, teaching, mentoring, advocating, and advising (Diaz et al., 2015). For example, the 4-H ambassador program is defined as promoting competency. The definitions allow each competency to include any 4-H program with similar learning objectives, regardless of the program name. This framework applies to programs lasting for multiple months or longer.

Our study aims to extend the discussion of how participation in 4-H activities influences leadership skills outcomes by answering the following:

- 1. Do youths in self-identified 4-H leadership competency programs report higher leadership life skills development than do youths in other 4-H programs?
- 2. Do youths who spend more years in 4-H leadership competency programs report higher leadership life skills development than do youths who spend fewer years in these programs?

METHODS

We created an online survey to measure the perceived leadership life skills among Illinois 4-H members ages 15 to 18. In 2016, we sent the anonymous survey to all 4-H members in this age group who had a known email address in the state membership database. Local 4-H staff were also asked to provide the survey link to teens in their units. One month later, we sent a follow-up email to the known email addresses to increase the responses. Respondents who completed the survey were entered into a drawing for one of five \$50 Amazon gift cards, funded by the Illinois State 4-H Office.

MEASURES

To explain the leadership competency framework to respondents, we included a definition of each leadership competency on the survey. Respondents were asked whether they were part of 4-H programs that met one of the six competencies' descriptions.

If members self-identified as part of any 4-H leadership competency program, they were asked to name the program. This allowed us to verify whether the program was affiliated with 4-H. Respondents could identify themselves as belonging to multiple leadership competency programs as well as multiple programs within a particular competency. For each leadership competency, respondents were asked to report the number of years and the number of hours per year spent participating.

Our study adopted the Youth Leadership Life Skills Development (YLLSD) scale (Seevers et al., 1995) to measure perceived leadership life skills. Various research involving 4-H and FFA audiences have used the scale (Davis et al., 2016; Leggette et al., 2013; McElravy & Hastings, 2014). The YLLSD 30-item scale was assessed for face and content reliability by a seven-member panel of experts and has a Chronbach's alpha reliability coefficient of .98 (Seevers et al., 1995).

The YLLSD scale defines leadership life skills by the same seven subdomains as does the 4-H leadership curriculum. These domains include understanding self, communicating, getting along with others, learning to learn, making decisions, managing, and working with groups (University of Illinois Extension, 2012). Each of the 30 YLLSD indicators asks participants to self-report their change in the skill from participating in the program by using a 4-part Likert scale ranging from *no gain, slight gain*, or *moderate gain* to *a lot of gain*. Each indicator is worth 0–3 points, for a total score of up to 90 points. Our survey also included demographic questions asking respondents' age, gender, race and ethnicity, and years of 4-H membership.

RESPONDENTS

Survey collection yielded 595 responses. This represented a 9.4% return rate compared to the total number of 4-H mem-

bers in the 15- to 18-years age group. We reviewed data based on gender, age, county, activities, and drawing entry to check for duplicate completion. We did not confirm any duplication—only two responses identifying FFA as the leadership program were removed.

Our sample included a higher proportion of females: 75% of survey respondents were females, while 60% of the Illinois 4-H member population were females at the time. The sample also contained a slightly higher proportion of minority youths. While 8% of 4-H members reported to be in a minority racial or ethnic group, 14% of survey respondents identified themselves with a minority racial or ethnic group. No attempt was made to oversample female or underrepresented member population. Smith (2008) found that females are more likely to respond to surveys. The relatively high percentage of minority members could be related to the racial composition in counties that promoted the survey.

Youths confirmed the leadership competency framework by reporting that their local programs fit into one or more framework categories. Table 1 compares demographic information of 4-H respondents who reported participation in leadership competency programs and those who did not report participation. Respondents who reported not participating in a leadership competency program are members of all other 4-H programs. These programs are not designed to meet the leadership competency framework's definitions and may include community clubs or special-interest clubs. The two groups reported similar demographic characteristics.

FINDINGS

To determine whether participating in 4-H leadership competency programs led to an increase in leadership life skills, we used an ordinary least squares (OLS) regression. The YLLSD score was the dependent variable, and participation in any 4-H leadership competency program was the independent variable. The regression model also controlled for respondents' years of membership in 4-H, age, and gender.

As detailed in Table 2, a statistically significant difference was found in leadership life skills scores between leadership competency program participants and all other 4-H program participants (F(4,434) = 6.10; p = .000), with an adjusted R² of .05. Compared to members in all other 4-H programs, on average, those who participated in one leadership competency program scored 1.55 points higher in leadership life skills.

The variable for gender also showed a significant relationship to leadership life skills (p < .05). Females scored 4.11 points higher than males. The additional control variables for years of 4-H membership and age did not project a significant relationship to YLLSD in the model or show significantly different effect sizes.

Leadership Life Skills Development in 4-H Teen Leadership Programs

	Youths in 4-H leadership	Vouths in all other 4-H programs
	competency programs	Toutis in an other 4-11 programs
Males	90 (24.9%)	24 (20.3%)
Females	272 (75.1%)	94 (79.7%)
Caucasian	323 (85.4%)	110 (89.4%)
African American	26 (6.9%)	3 (2.4%)
Asian	9 (2.4%)	3 (2.4%)
American Indian or Alaska Native	8 (2.1%)	2 (1.6%)
Some other race	12 (3.2%)	5 (4.1%)
Hispanic	14 (3.7%)	7 (5.7%)
Average age	16.99 years	16.84 years
Average number of years in 4-H	6.86 years	6.41 years

Table 1. Demographic Comparison of Youths in 4-H Leadership Competency Programs and All Other 4-H Programs

Note. Some respondents chose not to disclose their gender, race, or ethnicity.

Table 2. Regression Analysis of YLLSD Scores and Involvement in 4-H Leadership Competency Programs

	В	SE	t
(Constant)	50.92**	5.18	9.83
Participation in leadership competency programs	1.55**	.46	3.39
Years of 4-H involvement	.32	.29	1.08
Age	1.13	.71	1.58
Gender (<i>Female</i> = 0, <i>Male</i> = 1)	-4.11*	1.91	-2.15
Adjusted $R^2 = .05$		n = 439	

* *p* < .05, ** *p* <.01

Table 3. Mean Values and Correlation Coefficients of YLLSD and Years Spent in 4-H

 Leadership Competency Programs

Leadership competency	n	YLLSD		Years in programs		r
		Mean	SD	Mean	SD	
Planning	298	71.91	16.70	3.29	1.83	03
Promoting	196	72.68	15.93	3.69	1.87	.05
Teaching	216	71.33	17.75	3.01	1.79	.00
Mentoring	106	70.76	19.93	3.74	1.78	.30**
Advocating	79	73.46	17.68	3.47	1.72	.22*
Advising	98	72.51	15.11	3.31	1.73	.06

* p < .05, ** p < .01

The second research question asked whether the amount of time spent participating in leadership competency programs was related to leadership life skills development. To answer this question, we completed bivariate correlations between YLLSD and years of participation in programs defined by the six Illinois leadership competencies. Because respondents could respond that they participated in multiple leadership competency programs, each of the six competencies was analyzed individually.

Table 3 includes the mean and standard deviation for YLLSD scores and years spent in each leadership competency program and their correlation coefficients. Leadership competency programs focusing on mentoring (r(104) = .30; p < .05) and advocating (r(77) = .22; p < .01) were the only two with significant, yet weak, correlations between participants'

YLLSD scores and time spent in the programs. Regardless, our study shows that longer participation in these two leadership competency programs would increase 4-H members' leadership skills.

LIMITATIONS

The data presented represents 4-H members' perception of leadership taught in 4-H programs. The survey relied on 4-H members to self-identify their participation in leadership competency programs. While respondents listed names of their programs, we did not crosscheck each program with the competency framework to confirm that the program matched well with the guidelines. However, this study suggests that youths recognized the leadership framework characteristics in their local programs, providing confirmation that the adult-created framework matches experiences perceived by youths.

While the relationship between leadership life skills and participation in leadership competency programs was significant, our model with a low adjusted-R square indicates that in the future, we should also consider other important factors that relate to youth leadership life skills development outside program participation. We did not control for other 4-H leadership experience or experience outside 4-H. Respondents may have had leadership roles, such as serving as 4-H club presidents, but their 4-H clubs were not designed as only leadership competency programs. Respondents might also be part of other organizations promoting leadership.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The results of our study support past findings that participation in leadership programming increases perceived leadership life skills development. The study adds to the conversation by providing evidence that youths recognize the same activities in leadership programming as described in the leadership competency framework, and their participation in these programs leads to higher leadership skills achievement when compared to that of 4-H members in other 4-H activities.

This study described the Illinois leadership competencies framework to 4-H program participants. Those who recognized these leadership competencies in their programs reported higher leadership life skills, providing evidence that 4-H leadership programs modeled from the leadership competency framework include the activities necessary for developing leadership life skills.

For a majority of the study participants in leadership competency programs, the number of years spent in the

program was not related to their leadership life skills development. In other outside school programs, attendance itself is not associated with outcomes (Hirsch et al., 2010). Roth et al. (2010) defined participation as intensity, duration, total exposure, breadth, and engagement. A more detailed and accurate framework of participation could explain the aspects of participation that may lead to developmental outcomes.

In this study, females reported higher leadership life skills development than did males. This same finding is in other studies of leadership life skills (Phelps & Kotrlik, 2007; Real & Harlin, 2006). It is unclear whether this finding is due to program characteristics that foster development in females over males or whether female involvement involves more intensity or engagement, leading to different outcomes. It is important to keep this gender difference in mind when facilitating leadership programs.

4-H will continue to provide youths with opportunities for leadership life skills development. We recommend that program planners:

- use the Illinois leadership competencies framework to design or evaluate local 4-H leadership programs;
- confirm that 4-H members are aware of the outcome and incorporate time to reflect on skill growth, if leadership skills development is a specific program outcome;
- educate 4-H volunteers to create experiences designed to build leadership life skills; and
- recognize that youths learn at different rates and support their individual development.

Lastly, our study only included youths enrolled in Illinois 4-H. It has limited external validity. However, it provides an opportunity to apply the leadership competency framework to other states' 4-H programs and offer comparisons in the future. The framework allows for the local flavor of leadership programs and adds to the discussion of common leadership development program characteristics.

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4-H Student Nutrition Advisory Councils Support Positive Youth Development and Health Outcomes Among Underserved Populations

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Abstract. 4-H SNAC Clubs engage youth in low-income schools with majority Latinx enrollment in leadership activities to increase schoolwide health and wellness. 4-H SNAC Clubs aim to develop youth health leaders, establish youth-adult partnerships, and increase access to 4-H in Latinx communities. Outcomes related to healthful living and positive youth development were assessed using the Teen Teacher Retrospective Survey (n=59) across five 4-H SNAC Clubs. Results show positive outcomes related to self-reported health behaviors for students and their families and leadership development. 4-H SNAC Clubs can increase access to 4-H among Latinx youth and support healthier communities through the Supplemental Nutrition Assistance Program – Education programming.

INTRODUCTION

Positive youth development (PYD) programs have been shown to achieve significant and beneficial effects related to psychological adjustment, academic achievement, self-perception, and emotional stress (Ciocanel et al., 2017). Successful PYD programs recognize the potential in youths and create supportive and empowering environments, provide activities for youths to build their skills, and offer opportunities for youths to broaden their horizons (Roth & Brooks-Gunn, 2003).

In Cooperative Extension, 4-H youth development (4-H) is the primary PYD program; however, historically, youths of color have been less likely to participate in 4-H (Hamilton et al., 2014; Smathers et al., 2019). Goals toward increasing equitable access to 4-H are reflected in the

4-H Strategic Plan (National Institute of Food and Agriculture, 2017), which envisions that by 2025, 4-H will reflect the population demographics, vulnerable populations, diverse needs, and social conditions of the U.S.

Barriers to participation in 4-H and other PYD programs among underserved communities include lack of awareness about programs, lack of affordability, conflicting schedules with parents' work, distance and lack of transportation, and perceived exclusion (Avent & Jayaratne, 2017). However, previous research has shown that offering tailored, site-based youth development programs can help Extension reach underserved youths (Skuza, 2004).

The 4-H Student Nutrition Advisory Council club program (4-H SNAC; Fabregas Janeiro et al., 2019; University of California Cooperative Extension, n.d.) was developed to engage youths from low-income schools with majority Latinx enrollment in nutrition and health leadership. 4-H SNAC is a collaboration between two University of California Cooperative Extension (UCCE) programs: 4-H and the Supplemental Nutrition Assistance Program Education (SNAP-Ed). The goals of 4-H SNAC are to (a) develop youth leaders in nutrition and physical activity to create healthful schools and communities, (b) establish positive youth-adult partnerships to improve youth outcomes related to health and academics, and (c) increase access to 4-H among underserved Latinx communities. The program incorporates 4-H and SNAP-Ed curricula, leadership development, health advocacy skills (Klisch & Soule, 2018), and school wellness (Klisch & Soule, 2019a).

In this paper, we examine the nutrition and PYD outcomes reported by a cohort of youths participating in 4-H SNAC.

METHODS

We implemented 4-H SNAC in five elementary schools across two counties during academic year 2018–2019. Community education specialists from UCCE (specialists), funded jointly through SNAP-Ed and 4-H, led the recruitment and facilitation of 4-H SNAC. We recruited fifth- and sixth-grade youths primarily through classroom announcements, and all youths who met criteria were included (see Figure 1). Two specialists facilitated each 4-H SNAC meeting for a minimum of 1 hour per week from October through May, with time off for school holidays and conferences. All 4-H SNAC clubs had at least one adult per every 10 youths. All specialists had experience and expertise in nutrition and food safety and received additional training in youth engagement, cultural responsiveness, and 4-H PYD tools and methods.

Throughout the school year, 4-H SNAC youth leaders (youth leaders) were invited to participate in additional programming outside their afterschool meetings, including a 6-hour leadership training and culinary academy (Klisch & Soule, 2019b). At all school sites, youth leaders were involved in leading, supporting, or maintaining environmental changes on their campuses. At three of the schools, youth leaders were involved in designing, building, or maintaining their school garden, and at all five schools, youth leaders collaborated with cafeteria staff to create changes to the lunchroom environment to encourage peers to select and eat healthful foods. All youth leaders were offered opportunities to teach nutrition and/or cooking lessons to other youths and community members based on their interests and availability.

To assess self-reported PYD outcomes and health behaviors after participation in 4-H SNAC, specialists administered the Teen Teacher Retrospective Survey in May 2019 at all five clubs with all youth leaders in attendance on the day of administration. Specialists read the consent letter aloud, and youth leaders completed the survey independently. Evaluation procedures were reviewed and approved by institutional review at the University of California, Davis.

SURVEY TOOL

The Teen Teacher Retrospective survey is based on the 4-H Common Measures Teen Teacher Survey (Retrospective) (Lewis et al., 2015). The survey includes five sections: (a) Food choices, (b) Engagement, (c) Leadership skills, (d) Open-ended perceptions, and (e) Demographics. Sections 1 and 2 include questions for which youth leaders indicated their level of agreement with statements about their experiences in the program and behaviors using a 4-point scale from *strongly agree* to *strongly disagree*. One subset of questions in Section 1 included the option to select *not applicable*.

Section 3 included retrospective pre–post questions for which youth leaders self-rated their skills at the end of the intervention, thinking about themselves *before* and *after* the program on a 4-point scale from *excellent ability* to *no ability*. Retrospective pre–post survey questions are frequently used to measure outcomes in self-reported behavior changes in Extension programs (Rockwell & Kohn, 1989), and some evidence suggests that they provide a more accurate measure of preintervention behavior, may reduce response-shift bias (Allen & Nimon, 2007), and can be effectively administered with youths (Young & Kallemeyn, 2019).

In Section 4, youth leaders were asked to respond to two open-ended questions: "What was the best part of participating as a teen teacher or mentor in this program?" and "What could be done to make your experience as a teen teacher or mentor even better?"

ANALYSIS

Researchers analyzed quantitative survey data by using SPSS version 25. For the nonretrospective questions, researchers used descriptive statistics, placing participant responses into frequency tables and locating the mode. Researchers looked at both percentages and numbers of students selecting each response on the 4-point scale, and for further analysis, researchers also collapsed the 4-point scale to identify areas where the most youths agreed or disagreed. For the retrospective pre-post questions in Section 3, differences in mean *"before"* and *"after"* ratings were analyzed by using paired *t*-tests. Only surveys with both a *"before"* and *"after"* rating were included in the analysis, and a *p*-value of less than 0.05 was interpreted as significant.

For the open-ended questions, researchers used a general inductive approach (Thomas, 2006) to identify frequent or significant themes and gain a wide understanding of all perceived program effects reported by youth leaders. Researchers exported data into a spreadsheet for initial reading and then highlighted phrases or themes that appeared multiple times while keeping a count of how frequently phrases appeared to get an understanding of whether the experience was more widespread or unique to specific youths. Researchers condensed themes into broader categories and then discussed findings with specialists until agreement was reached on interpretation of the results.

RESULTS

Fifty-nine youth leaders completed the Teen Teacher Retrospective, and distribution of responses approximately mirrored overall enrollment in each of the clubs (see Figure 2). Most respondents identified as Hispanic or Latino (78%) and female (52%), although 34% of respondents did not indicate their gender.

Most youth leaders (see Table 2) reported that as a result of participating in 4-H SNAC, they make healthful food choices (88%), eat more fruits and vegetables (74%), and eat less junk food (58%). Family outcomes reported by most included that their family has purchased (80%) and prepared (78%) healthier foods. In addition to nutrition behaviors, youths reported PYD outcomes responding that because of participating in 4-H SNAC, they can make a difference in

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Figure 1. 4-H Student Nutrition Advisory Council (4-H SNAC) flowchart of participation.

their community (86%), are more confident in helping others (90%), and are more confident in themselves (76%).

For engagement during the program, youth leaders reported that in 4-H SNAC, dedicated adults supported them as a teen teacher (92%) and provided ongoing training and support throughout the program (93%), and that they felt "set up" for success (79%).

In addition, we observed statistically significant increases between before and after self-ratings for all five leadership skills (see Table 3).

Forty-eight youths responded to the open-ended, qualitative questions. Researchers categorized the experiences that youths valued most into four categories: (a) opportunities to contribute, (b) opportunities for personal growth, (c) relationships, and (d) activities. Opportunities to contribute included themes of helping others (10 youths) and teaching others (6 youths). One youth shared, "The best part of being a teen teacher or mentor is that you're helping." Opportunities for personal growth included themes of learning leadership skills (10 youths) and learning how to cook or make food (4 youths). One youth wrote, "I got to learn leadership[, which] will help me teach skills to others." Relationship themes included interacting with kids (3 youths), interacting with the specialists (2 youths), and interacting with each other (2 youths). For activities, themes included saying the pledges (2 youths), hosting food tastings in the cafeteria (2 youths), and cooking (4 youths). Another youth wrote, "I think the best part of participating is that we got to have fun and cook/ make great foods."

Researchers categorized youth responses about improvements to 4-H SNAC into themes of (a) providing more of what is already offered, (b) making changes to what is offered, and (c) making no changes. For the first theme, youths wrote that they wanted more opportunities to cook, present and/ or teach, and be physically active. One youth expressed, "It's already very good, but having a few more events." For the theme of changes, youths recommended changing the recipes that they prepared and having more opportunity to select their own recipes. Related to the theme of no changes, 17 youth leaders reported that they would not make any changes to the club. One youth wrote, "Nothing could make my experience even better[;] it was perfect."

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	Se	ection 1 Health Beha	viors		
As a result of participating in	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
the Program,	n (%)	n (%)	n (%)	n (%)	n (%)
I think about what foods my body needs during the day	7 (12%)	43 (75%)	4 (7%)	—	3 (5%)
I make healthy food choices whenever I can	11 (19%)	40 (69%)	6 (10%)	—	1 (2%)
I eat more fruits and vegetables	12 (21%)	31 (53%)	11 (19%)	1 (2%)	3 (5%)
I eat more whole grains	5 (9%)	33 (58%)	15 (26%)	_	4 (7%)
I eat less junk foods	6 (10%)	28 (48%)	17 (29%)	6 (10%)	1 (2%)
I drink less soda	20 (34%)	20 (34%)	13 (22%)	4 (7%)	1 (2%)
I drink more water	33 (57%)	19 (33%)	5 (9%)	1 (2%)	—
Because of this Program	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly I n (9	Disagree 6)
My family has purchased healthier foods	12 (21%)	34 (59%)	10 (17%)	2 (39	%)
My family has prepared healthier foods	11 (19%)	34 (59%)	13 (22%)	_	
I learned cooking skills	37 (65%)	16 (28%)	4 (7%)	_	
I use cooking skills to prepare food at home	20 (35%)	23 (40%)	10 (18%)	4 (79	%)
I wash my hands frequently	41 (71%)	14 (24%)	3 (5%)	_	
		Section 2 Engagem	ent		
Deserves of this Dusquere	Strongly Agree	Agree	Disagree	Strongly I	Disagree
Because of this Program	n (%)	n (%)	n (%)	n (%	6)
I can make a difference in my community through commu- nity service	13 (22%)	38 (64%)	7 (12%)	1 (2'	%)
I gained skills though serving my community that will help me in the future	20 (34%)	32 (55%)	5 (9%)	1 (24	%)
I taught others	11 (19%)	34 (58%)	13 (22%)	1 (29	%)
I acted as a mentor to others	9 (15%)	34 (58%)	13 (22%)	3 (59	%)
I am more confident in helping others	25 (42%)	22 (48%)	5 (8%)	1 (79	%)
I am more confident in myself overall	23 (39%)	22 (37%)	10 (17%	4 (7)	%)

4-H Student Nutrition Advisory Councils Support Positive Youth Development

Table 1. (continued)

Section 2 Engagement (continued)					
During the Drogram	Strongly Agree	Agree	Disagree	Strongly Disagree	
	n (%)	n (%)	n (%)	n (%)	
There were dedicated adults					
who supported me as a teen	26 (44%)	28 (48%)	4 (7%)	1 (2%)	
teacher					
I received ongoing training					
and support throughout the	21 (36%)	34 (58%)	3 (5%)	1 (2%)	
program					
The program made sure I had					
everything I needed to be a	23 (39%)	30 (51%)	6 (10%)	—	
successful youth leader					
I received recognition and	16 (28%)	29 (50%)	10 (17%)	3 (5%)	
reward for my teaching efforts	10 (2070)		10 (1770)		
I felt "set-up" for success by	16 (28%)	30 (52%)	11 (19%)	1 (2%)	
adults running the program	10 (2070)	30 (3270)	11 (1970)	1 (270)	
I received feedback on how	9 (16%)	41 (71%)	5 (9%)	3 (5%)	
well I was doing as a teacher	> (10/0)	H (/ 1 /0)	5 (570)	5 (570)	



Figure 2. Participation in SNAC and survey response by school.

Table 2. Retrospective Reporting of Leadership Skills Before and After Participating in SNAC

Statements	<i>Before</i> Mean rating	<i>After</i> Mean rating	Difference
I can lead group discussions. ^a	1.07	1.91	0.84*
I can work as a team member. ^a	1.6	2.39	0.79*
I can teach others. ^b	1.43	2.18	0.75*
I can speak before a group. ^b	1.09	1.75	0.66*
I can plan programs. ^a	.95	1.61	0.66*

^a n = 57

^b *n* = 56

* *p*-value <.001

DISCUSSION

These data point to the effectiveness of 4-H SNAC in supporting the development of student leadership to create healthful schools and communities through positive youthadult partnerships and increasing access to 4-H in low-income and predominately Latinx communities. The following are implications for Extension professionals interested in implementing 4-H SNAC.

DEVELOPING YOUTH LEADERS

4-H SNAC is a promising intervention to support PYD and health-related outcomes in historically underserved communities. Outcomes include improvements in self-reported health behaviors and self-confidence. In addition, youths self-reported positive shopping and food-preparation behaviors for their families, suggesting that youths can serve as effective educators for their families. This conclusion is supported by other research showing that educating youths can influence family behaviors (Boudet et al., 2016; Damerell et al., 2013). Moving forward, one of the goals emerging from this project includes increasing family engagement in 4-H SNAC activities. These outcomes support the positive development of youths and youth leadership.

ESTABLISHING YOUTH-ADULT PARTNERSHIPS

A majority of youth leaders reported that they believed that specialists were dedicated and supportive. 4-H SNAC Club adult leaders should be trained in youth-adult partnerships to develop caring and connected relationships with youth participants. Beyond this, 4-H SNAC youth leaders should have opportunities to learn from adults who share similar backgrounds, life experiences, languages, and culture or who are trained to work in ways that avoid microaggressions and be culturally responsive. One barrier encountered early in this intervention was the need to expand the division's recruitment policies to be able to intentionally hire bilingual, bicultural staff. Implementing this intervention with staff-who deliver 4-H programming at a local level, which historically has been delivered by program volunteers-is a limitation that Extension professionals may need to address, particularly because increased staffing requires additional program funding.

INCREASING EQUITABLE ACCESS TO 4-H

Since implementation of the first 4-H SNAC program in 2015–2016, there has been an incease in Latinx youth enrollment in 4-H in San Luis Obispo and Santa Barbara counties. In program year 2014–2015, total Hispanic or Latinx enrollment for both counties was 8,788 youths, compared to 12,052 in 2018–2019. This represents a 37% increase in Hispanic or Latinx enrollment.

4-H SNAC was imagined as a collaborative project to engage youths in low-income, majority Latinx communities in building skills and confidence to promote and advocate for health. It was also designed to create institutional change within Extension through expanding program delivery models to be more inclusive of underrepresented youths in 4-H and to provide a mechanism for youths to influence and affect SNAP-Ed programming. To that effort, many institutional barriers remain—for example, a considerable amount of 4-H enrollment paperwork is not always available in languages used by families at home. Further work is needed to examine these barriers and work with policy makers to create institutional changes informed by the experiences of youths and communities.

Youth readiness researchers (Krauss et al., 2016) have discussed the importance of removing institutional barriers that limit opportunities for vulnerable youths. However, they have posited that "problem-free is not fully prepared" and that we cannot wait until barriers are removed before focusing on the positive development of youths. Youths must also be engaged in owning and seeking out supports and opportunities to thrive in the situations they are currently in.

4-H SNAC clubs are one strategy to increase equitable access to 4-H among underserved, Latinx communities. During one program year, several youth leaders asked the specialist whether they would start a club at their middle school and expressed concern that they would not have a 4-H SNAC club after graduation from sixth grade. Future program expansion into middle and high school would potentially allow more continuity for these PYD outcomes to grow along with greater positive impacts to the health of communities.

CONCLUSION

Overall, 4-H SNAC is one program that has the potential for developing student leaders to increase community health and advance equitable 4-H access among Latinx youths. Over the next 5 years, 4-H SNAC is being expanded into new communities through a multistate grant award (information about this grant is available in Children, Youth, and Families at Risk Sustainable Community Projects at https://nifa. usda.gov/program/children-youth-and-familiesrisk-cyfar). Future research will include evaluating policy, system, and environmental changes as well as beginning assessment of long-term health impacts for participants and their communities.

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Kentucky Equestrians: Defining Socioeconomic Contexts for Extension Programming

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Abstract. Understanding relationships between demographic and economic factors and equestrian participation could improve horse program design. We implemented an online survey that characterized associations of participation in equine activities, socioeconomic factors, and economic factors with age. Seventy-five percent of respondents ride, and 34% are recreational, non-competitive participants. Respondents were mostly female, and many participate in the sport throughout life. Many respondents indicated they overspent on equestrian activities. Horse programs should incorporate information and activities that address issues unique to females, should develop skills required by amateur or recreational riders, and should incorporate information on financial wellness.

INTRODUCTION

Armed with a better understanding of the relationships between equestrian *age*, *participation type*, and *socioeconomic factors*, agents could potentially improve the design and delivery of equine-related messages. Improved messaging could, in turn, allow agents to more effectively reach at-risk populations who might benefit from equestrian programming, teach economically realistic equine-care principles, and ultimately improve human and horse health. Cooperative Extension agents involved in horse programming often lack information about the relationships between participation in equestrian activities and socioeconomic statuses of their participants. Prior data have characterized horse owners and ownership and trends in horse management (Stowe, 2018). However, these data may not characterize equestrians who do not own horses.

The 4-H Horse Program, which is tailored to the characteristics and needs of youth equestrians and their mentors, serves as an illustrative model. For example, because the cost of horse ownership averages \$2,500–\$4,500 annually per animal (Galloway & Gallagher, 2002; University of Maine Cooperative Extension, 2012) and only 1.3% of U.S. households own horses (American Horse Council, 2018), 4-H programmers have developed mechanisms that allow youth to lease or otherwise have short-term access to project horses to advance their equestrian knowledge and skills. Many 4-H programmers also make use of experienced adult equestrians as volunteers. This volunteerism benefits not only 4-H youths (DeCubellis & Barrick, 2021) but adults, as researchers have associated volunteerism with better health outcomes (United Health Care, 2019). The 4-H Horse Program also integrates well with 4-H Healthy Living programs that aim to address various socioeconomic and health disparities to improve activity levels, foster healthy food choices, and decrease negative health risks (Downey et al., 2014). In sum, 4-H offers culturally relevant, age-, and economically appropriate horse-related programming that youth development researchers have recognized as effective across a wide range of communities and demographics (Lerner & Lerner, n.d.).

We hypothesized that an even more complete and nuanced characterization of Kentucky equestrian participation would permit University Extension programmers to refine program design and tailor delivery methods. To this end, our semiquantitative research study was launched in 2019 to answer three questions: (a) Does participation type vary by age and years of participation? (b) Are there associations between socioeconomic factors and age? and (c) How do economic factors of participation vary by age? Because we recruited survey respondents from the wider equestrian community, our findings characterize all those who participate in equestrian activities, not only horse owners.

METHODS

We designed a survey questionnaire based largely on the National Health and Nutrition Examination Survey for

socioeconomic and economic categories (Centers for Disease Control and Prevention [CDC] & National Center for Health Statistics [NCHS], 2017). Equestrian-specific questions were developed that represented gaps in understanding of potential economic disparities that we have observed but are not widely documented relative to riding versus nonriding participation in equine activities. The Female Equestrian Health and Wellness (FEHW) Community of Practice (Female Equestrian Health Community of Practice, 2020), a group of university researchers, professional equestrians, and clinical practitioners in the equine industry, reviewed the draft questions. Based on their input, edits were made to make terminology consistent and to ensure that the questions were applicable across the United States and international sites. The questionnaire could be completed by respondents anonymously via a Qualtrics online platform; the survey took about 10 minutes to complete. Respondents self-selected based on limited distribution channels, and no efforts were made to ensure balance between vocational and avocational participation. Only respondents ages 18 years and older were included. No identifying information was collected. "Prefer not to answer" was a response option for survey items deemed potentially sensitive, and selection of this option did not preclude the use of other responses from that individual. We excluded respondents who indicated "I do not participate in the horse industry." We instructed respondents that their completing the survey would improve our understanding of the socioeconomic status and other characteristics of people involved in equine-related activities. Participation type was defined for respondents as "professionals" who receive payment for riding, training, grooming, and so forth; "amateurs" who are competitive but do not receive financial compensation; "recreational" participants who engage in noncompetitive, recreational equine activities; "handlers" or general caretakers of horses; and "volunteers" assisting in delivery of horse-specific activities (camps, therapy, lessons, etc.). A total of 1252 questionnaires were completed from 1689 responses initiated (74%). Individuals from the United States submitted 59% of responses, with 34% of those from the state of Kentucky (n = 255). This report focuses on Kentucky participants, so all 255 responses were included.

We used chi-square and ANOVA tests to determine the relationships between participation, socioeconomic, and economic factors of participation by age. All survey questions had multiple-choice, categorical answers (see Table 1). For analytical purposes, we regrouped household and personal income data into three categories: low to middle (less than \$50,000), middle (\$50,000 to \$100,000), and middle to high (greater than \$100,000). The University of Kentucky Institutional Review Board (#48275) approved this project.

RESULTS

DEMOGRAPHIC CHARACTERISTICS

As in prior industry surveys (American Horse Council, 2018; Stowe, 2018), the majority of respondents were females (95%; see Table 2). The majority of respondents also reported as "White, Non-Hispanic or Latino." Two-thirds of respondents categorized their equine-related activities as "Amateur" or "Recreational," and about one-quarter chose "Professional." (See Figure 1.) More than 35% of "Amateur" and "Recreational" participants were ages "31–50 years." More "Professionals" were ages "18–30 years" (45%) compared to other age groups ($\chi\chi^2 = 22.448$; df = 12; p = .0328).

PARTICIPATION FACTORS

Seventy-nine percent of all respondents reported "over 20 years" of experience with horses, and we observed a strong association between age and length of equine experience ($\chi\chi^2 = 105.524$; df = 12; p = .0001). Three quarters participated by "riding/training" horses. Of these riders, 100% "over age 71" reported "over 20 years" of experience with horses. The majority of riders focused on "English" riding disciplines, with more than 90% of amateurs participating with English seats.

Sixty-two percent of all respondents had in the past or currently participated in a club, breed society meetings, or educational events. We observed a weak relationship between club participation and age ($\chi\chi^2 = 7.94$; df = 3; p = .0473), with 72% of "*ages 31–50*" and 61% of "*ages 51–70*" reporting club participation.

SOCIOECONOMIC STATUS FACTORS

The majority of respondents (58%) indicated that their perceived childhood socioeconomic background was "upper class." We observed no relationship between perceived childhood socioeconomic status and age. Only 5% of respondents characterized their current (adult) socioeconomic status as "upper class," with 45% in the "upper to middle" class category. We noted a strong relationship between current socioeconomic status ($\chi\chi^2 = 34.568$; df = 12; p = .0005) and age. The largest prevalence in the "low to middle" class category was in ages "18–30 years." In the age categories "18–30 years" and "31–50 years," the location of childhood home was predominantly "rural." (See Table 3.) Only 42% of respondents indicated that their families were involved with horses, and there were no relationships to age.

ECONOMIC FACTORS OF EQUESTRIAN PARTICIPATION

Eighty percent of "ages 18–30" reported "low to middle" personal salary range, comprising 28% of the total population. (See Figure 2.) We observed a strong relationship between salary and age, with 54% reporting earnings in the "low to middle" salary range ($\chi\chi^2 = 60.268$; df = 9; p = .0001).

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Table 1. Selected Questions and Potential Answer Choices	5
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Question	Potential answers
Participation Factors	
How long have you been interacting with horses?	1-3 years, 4-6 years, 7-10 years, 11-19 years, over 20 years
How do you participate with horses?	Riding/training (examples: Showing, Handling, Driving, Mounted); Supporting (examples: Volunteer, Farmwork, Care, Supporting services like feed or veterinarian care)
What is your primary use or seat discipline during riding?	English (examples: Dressage, Hunt seat, Eventing); Western (examples: Pleasure, Working cow horse, Reining, Western dressage)
Do you or have you participated in a horse club, breed society meetings, or horse education?	Yes, No
Socioeconomic Status Factors	
How would you characterize your socioeconomic background as a child?	Upper class, Middle to upper, Low to middle, Prefer not to answer
How would you characterize your current socioeconomic status?	Upper class, Middle to upper, Low to middle, Prefer not to answer
How would you characterize the location where you grew up?	Rural/farm, City/urban (small or large), Suburbs
How would you characterize the location where you currently live?	Rural/farm, City/urban (small or large), Suburbs
Was your family involved with horses Yes, No when you were a child?	
Economic Factors of Participation	
Please indicate the answer that includes your entire household income (combined salaries/income of everyone in household who works or brings in an income) in the previous year before taxes.	Less than \$20,000; \$20,000 to \$34,999; \$35,000 to \$49,999; \$50,000 to \$74,999; \$75,000 to \$99,999; \$100,000 to \$149,999; \$150,000 to \$199,999; \$200,000 or more; prefer not to answer.
What is your salary range (what you personally make as income)?	Less than \$20,000; \$20,000 to \$34,999; \$35,000 to \$49,999; \$50,000 to \$74,999; \$75,000 to \$99,999; \$100,000 to \$149,999; \$150,000 to \$199,999; \$200,000 or more; prefer not to answer.
Indicate your agreement with this statement: I overspend (i.e., expenses exceed my income) on my horse participation.	Strongly agree, Agree, Disagree, Strongly disagree
What percentage of your disposable income do you spend on the following items? (Must total 100%.) For this question, please consider your disposable income anything left after your essential living expenses are paid (housing, utility bills, car/home insur- ance, etc.).	Horse, Dining out, Movie/theater, Clothing, Other

Table 2.	Age by	Sex of	Respondents	(n = 255)
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Demographic Factor	Female, % (<i>n</i> = 242)	Male, % (<i>n</i> = 13)
18-30 years	36	15
31-50 years	35	15
51–70 years	26	70
Over 71 years	3	0



Figure 1. Participation type.

We found a weak relationship between location of childhood home and personal salary ($\chi\chi^2 = 16.763$; df = 9; p = .0526). In Kentucky, 44% of those who reported spending their childhood in a "*rural*" setting remained in the "*low to middle*" (\$50,000 and below) personal salary range of adulthood salary. Forty percent of respondents with "*suburban*" childhood housing reported being in the "*middle*" (\$50,000 to \$100,000) category.

We noted a strong relationship ($\chi\chi^2 = 31.48$; df = 9; p = .0002) between household income and age, with higher incomes reported in later age ranges. (See Figure 3.) Location of childhood home was not a factor in household income, although economic category in childhood was related to adult household income, particularly in the "low" (household and childhood; 50%) and "high" (household and childhood; 38%) categories ($\chi\chi^2 = 21.623$; df = 9; p = .0102).

Thirty-five percent of respondents stated that they overspent (i.e., expenses exceeded income) on horse activities (e.g., care of horse, lessons, equipment, or competition fees). Of that proportion, we observed an association with age ($\chi\chi^2$ =

Table 3. Location of Childhood Home Distribution by Age

Age	Rural, %	Urban, %	Suburban, %
18–30 years ($n = 89$)	42	24	34
31–50 years ($n = 87$)	38	36	26
51–70 years (<i>n</i> = 71)	32	32	32
Over 71 years (<i>n</i> = 8)	25	50	25

16.953; df = 6; p = .0095), with 51% of respondents ages "18–30 years" agreeing with the statement. Agreement with overspending was related to personal salary ($\chi\chi^2 = 50.270$; df = 6; p < .0001), with 51% of those in agreement in the "low to middle" salary category. Proportion of disposable income spent was highest for all age categories. (See Table 4.)

DISCUSSION

We successfully characterized a sample of the Kentucky equestrian community through the use of an online questionnaire. We observed trends between participation type, socioeconomic factors, economic factors, and age. Most importantly, our study demonstrated that by directly engaging equestrians, Extension programmers should be able to accurately delineate their potential audience, thus enabling them to design horse programs that better fit participants' interests and needs. For example, the majority of our respondents were female, suggesting that programs should incorporate information and activities that specifically address issues that are unique to girls and women, such as barriers to engaging in sports, including female-specific equipment (e.g., sports bras; Burbage & Cameron, 2017), saddles fitting female anatomy (Quinn & Bird, 1996), or life course considerations for riding during pregnancy and urinary tract health (Alanee et al., 2009). We also learned that the majority of respondents participated in horse-related activities as amateur or recreational riders, suggesting that programs should be tailored to deliver the knowledge and skills required by those participating in that manner and at that level. Responses to the questionnaire revealed that Kentucky equestrians participate in horse-related activities throughout their life course, indicating that programming for experienced equestrians may be as welcome as the more common programs for younger, less experienced participants. The finding that only 42% of participants grew up in horse-participating families suggests an opportunity (and need) to expand messaging beyond traditional outlets. Perhaps our most unexpected findings were those related to the economics of equestrianism. A large number of respondents reported that they spend more of their disposable income on horse-related than other



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Figure 2. Salary category by age.



Figure 3. Household income category by age.

Table 4. Disposable Income Expenditure (Percentage ± SEM)

Age	Horse	Dining Outa	Movie or Theater	Clothing	Otherb
18-30 years	44 ± 2.6	22 ± 1.3	13 ± 1.2	10 ± 1.0	44 ± 2.6
31-50 years	47 ± 2.6	16 ± 1.3	11 ± 1.1	12 ± 1.0	44 ± 2.6
51-70 years	45 ± 2.9	15 ± 1.5	11 ± 1.3	12 ± 1.1	44 ± 2.6
Over 71 years	37 ± 8.6	16 ± 4.4	11 ± 3.8	15 ± 3.4	44 ± 2.6

^aWithin the Dining Out data, the only significant difference (p < .0013) in spending among age strata was between the "18–30 years" and "31–50 years" groups and the "18–30 years" and "51–70 years" groups. ^bOf those who specified, 31% indicated other animals, including dogs, cats, parrots, and livestock, as the main expenditures.

activities, and a significant percentage indicated that they spend more than their annual income on equestrian activities yearly. This finding points strongly to the need for horse programs to incorporate fiscal responsibility and financial wellness elements at all age levels. Although some program agents discuss costs of horse ownership (University of Maine Cooperative Extension, 2012), typically informal education programs with horse emphasis do not include topics related to financial wellness. The fact that we uncovered this characteristic of Kentucky equestrians underscores the need for approaches such as those used here to empirically establish the characteristics and needs of likely horse program participants prior to the design and delivery of such programs.

This study had a number of limitations. The sample size was small, and no efforts were made to ensure that the pool of respondents was representative of Kentucky equestrians as a whole. Not only was the sample small; it was skewed toward females. Recruitment for any future work will need to consider equestrian demographics and may need to use recruitment strategies that foster broader participation. Efforts to further include males and professional equestrians, such as riders in the thoroughbred industry, would also increase diverse viewpoints in future surveys. Given the complete absence of literature in this domain, however, we judge our study to be an important proof-of-concept: systematic characterization of program participants can be one approach to improving the quality of Extension programs.

In conclusion, the data gathered with our online questionnaire suggests that if appropriately designed, Extension horse programs can have a positive impact on participants of all ages, and programs that place an emphasis on financial well-being may be one way to ensure that participants will have the means to continue equine activities throughout their life. Larger, more representative surveys than that described here are needed to confirm and elaborate our findings. More generally, this work provides a proof-of-concept that survey instruments such as ours can be used to characterize actual and potential Extension equine program participants and that information could be used to improve and/or tailor programs. Although our focus here was equine-centric and our specific findings may not be applicable outside that context, the general method would seem to be applicable across many of Extension's program areas.

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Integrating Underutilized Black Volunteers in 4-H Youth Development Programs

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Abstract. 4-H Youth Development prides itself on providing essential resources to reach underserved minority populations. 4-H provides programming and professional development for volunteers to include diverse handson training, and cultural competency workshops. This article provides best practices for the inclusion of African American volunteers in 4-H programming efforts that could help extension educators better understand the need to include minority volunteer roles and responsibilities. These strategies include strengthening diverse volunteer make-up, increasing participation and trust among African American youth, and engaging volunteers working in educational organizations that could provide real world experiences for youth.

INTRODUCTION

Volunteer involvement in youth development programs is critical in planning meaningful and successful programs for underserved urban youth, especially in Black communities, where engagement in 4-H is low. 4-H youth development programs should continue to recruit, train, and identify diverse volunteers who reflect the youths in their communities. Efforts to develop traditional 4-H programs in urban and underserved communities face many challenges, and thus modifications are necessary to better serve their youths, such as diversifying and recruiting new volunteers (Bovitz et al., 2018). Today, 4-H volunteer involvement among parents showcases additional skill sets and experiences that could be valuable to 4-H programs in diverse settings (Culp et al., 2005). One way to increase enrollment among Black or minority youths in underserved communities is to engage other sets of volunteers, such as parents, mentors, or leaders, who look like the youths served in the community.

Avent and Jayaratne (2017) have pointed out that youths in underserved communities have low engagement in 4-H programs, which could have lasting negative effects toward participating, including the establishment of trust, awareness, and affordability. 4-H programs that consider underserved community resources, such as collaborations and partnerships, parent involvement, and addressing the challenges centered around youth trust and cultural barriers, make a difference (Bovitz et al., 2018). While more attention is now focused on disparities facing underserved communities and their youths, more efforts are needed (Webster, 2016). Specifically, limited research has considered the involvement of Black volunteers in 4-H programs and the effects of their participation on youths.

BLACK 4-H YOUTH & VOLUNTEER PARTICIPATION

A number of researchers (Cano & Bankston, 1992; Russell & Heck, 2008; Schinker, 2010; Weikert et al., 2015) have explored factors associated with participation and nonparticipation of minority youths in 4-H youth development programs. Several important findings relating to access, barriers, and parental involvement have been identified as relevant factors in minority youths' participation in 4-H programs. Cano and Bankston (1992) and Weikert et al. (2015) have pointed out that having a caring and trusting adult with common ties or interest in a program would be a motivational component to underserved Black youths to joining an after-school program. Cano and Bankston

Smith and Wiley

Best practice	Supporting literature	Strategies
Incorporate diverse staff members	Racial, ethnic, and cultural similarities between program staff, participants, and parents influ- ence relationships and daily interactions in a	Recruit faculty and staff members from 1890 universities. Use undergraduate and graduate student organizations, such
	positive way (Camino, 1992).	as Minorities in Agriculture, Natural Resources and Relat- ed Sciences (MANRRS) and Collegiate Farm Bureau, for recruitment.
		Initiate networking opportunities in diverse communities and businesses (e.g., barbershops and hair salons).
Develop relevant programs	Developing relevant programming for diverse populations can encourage parent participa-	Identify current in-school and after-school programs.
	tion in community-led experiences (Moodie & Ramos, 2014).	Identify community programming needs (e.g., soft skills development, public speaking).
		Develop programming based on the identified community needs.
		Identify a need to create an environment where parents can be involved in the development of new programs as well as the adaptation of existing programs.
Involve parents in program development	While developing "culturally relevant" pro- gramming in the community, it is imperative to include individuals who are representative of key stakeholders (Parra Cardona et al., 2012).	Partner with faith-based communities, recreational organi- zations, and other community-based organizations to recruit parents and participants (e.g., recreational sports centers, Boys & Girls Clubs).
		Provide parents with an active role in program planning, development, and volunteerism.
Adapt existing programming	Community organizations have current pro- grams being implemented on a regular basis (Moodie & Ramos, 2014). To engage Black parents, programs' design and delivery can be adapted (Moodie & Ramos, 2014)	Enhance programming modes of delivery. Provide continu- ous access to programs via synchronous and asynchronous experiences (e.g., social media engagement, Zoom, recorded training modules).
		Incorporate innovative tactics with traditional programming (e.g., incorporate the use of technology, online learning modules).
		Partner with Greek organizations (Pan Hellenic Council Organizations) that include mentoring and educational pro- gramming goals and models in which parents are active and leading members.
Meet families where they are	To engage Black parents in community ac- tivities, it is imperative to realize that not all parents have the ability to attend due to such	Use community centers for 4-H programming, volunteer training, and 4-H club meetings (e.g., community centers and churches).
	2014).	Gain support and build relationships with Black church and community leaders for support of essential needs (e.g., trans- portation, meeting space, meals).

 Table 1. Best Practices for Integrating Black Volunteers Into 4-H Youth Development Programs

Integrating Underutilized Black Volunteers in 4-H Youth Development Programs

(1992) have noted several constraints, including improvement of new knowledge and material for urban audiences, additional funding for more staff in urban areas, and lack of equitable treatment and criteria for judging projects in 4-H youth development programming. In addition, urban youths were less excited about special projects, such as animal science, due to having limited experience based on their urban locations and not being near farm areas in rural settings (Cano & Bankston, 1992).

Cano and Bankston (1992) have also noted that spending more time on planning and marketing 4-H programs among underserved communities would contribute to active participation. Parents mentioned that many adults would be interested in knowing more about the 4-H program (Cano & Bankston, 1992). Gill et al. (2010) have reported that parents and guidance counselors were the greatest influences on 4-H members' decisions to enroll and participate in 4-H programs in underserved settings. Archer-Banks and Behar-Horenstein (2008) have pointed out influential factors among Black parents involved in middle-school youth experiences, including flexible locations for meetings, mentoring and homework assistance, enhanced expectations for Black youths, and inclusiveness toward cultures that increases parents' knowledge and involvement. In addition, Howard (2015) has reported that parents perceive school-affiliated educational programs as lacking in efforts to recruit and engage Black volunteers in extracurricular activities. Therefore, action steps are needed to foster an environment that prepares minority volunteers to engage underserved Black youths.

BEST PRACTICES FOR ENGAGING BLACK VOLUNTEERS

Research shows that low-income, minority communities hold the same attitudes and expectations about education and pastime experiences as other communities, yet they are faced with greater barriers that may limit involvement (Murray et al., 2014). A review of literature was conducted to glean best practices as they relate to Black community engagement in 4-H youth development programs.

While it is evident that Black parents seemingly want to be more involved in extracurricular experiences with their children, evident limitations prevent this involvement from happening. The following table highlights some best practices to consider while seeking the participation of Black volunteers in 4-H youth development programs.

CONCLUSION

Recognizing the need to encourage Black volunteer involvement within community organizations as a missing link to minority participation is a modern-day issue that needs to be addressed. While it is evident that more minority parents need to be actively involved in such roles as community volunteers, highlighting strategies and providing action items to be implemented by organizational leaders is a step in the right direction. The aforementioned strategies provide recommendations for underserved Black communities to not only recruit and maintain parents and youth participants but also set the tone for 4-H programs to create modifications within current programming efforts, working toward an ultimate goal of creating a greater minority youth presence in 4-H programs.

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Developmental Evaluation for Extension Programs

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Abstract. Logic models have garnered acclaim for their usefulness and disdain for the time required to create good ones. We argue that the orderly, analytical nature of logic models is opposed to many Extension programs, and we explain developmental evaluation, an approach that highlights ongoing development, adaptations, and rapid response. We use our recently completed evaluation of the 4-H Science: Building a 4-H Career Pathway Initiative to demonstrate developmental evaluation's key principles. Recommendations for Extension include the need to embrace developmental evaluation for program planning and evaluation and for Extension evaluators to conduct case studies using developmental evaluation and other approaches.

INTRODUCTION

Extension evaluation has faced criticism for relying on the use of logic models while excluding other concepts (Franz et al., 2014). Here, we discuss why developmental evaluation may be better suited to many cases of Extension evaluation and present a case study that supports this idea.

LOGIC MODELS

Extension

Logic models, a driving force for program evaluation, were first used in the 1970s, and Wholey's Evaluation: Promise and Performance was the first published work to use the term "logic model" (McLaughlin & Jordan, 2015; Taylor-Powell & Henert, 2008; Wholey, 1979). Logic models are visual diagrams of how a program is supposed to work (Huhman et al., 2004), emphasizing program theory, logic, the working together of cause and effect, analytical thinking, planning, and communication (Julian et al., 1995; Knowlton & Phillips, 2013; Taylor-Powell & Henert, 2008). Logic models delineate combinations of and alignments among issues, inputs, outputs, and outcomes (Funnell & Rogers, 2011; Porteous et al., 2002). Scholars, evaluation experts, program planners, and practitioners espouse the value of logic models for judging a program's feasibility, developing a program, developing performance measurement and monitoring systems, and pursuing knowledge (Hernandez, 2000; McLaughlin & Jordan, 2015; Savaya & Waysman, 2008). Logic models tend to work especially well with clearly defined program goals (Wholey, 2003). The logic model has become a preeminent program evaluation mechanism, particularly for impact evaluation (Carpenter, 2016; Renger et al., 2011).

Despite more than 40 years of acclaim, logic models have faced criticism. Gamel-McCormick (2011) conducted a case study of logic model creation with a nonprofit organization focused on community services for individuals with intellectual disabilities. The findings demonstrated many benefits of logic models, including expanding knowledge of the program among stakeholders. However, the findings also identified that the development of logic models is timeconsuming, as is consistent with the findings of Gugiu and Rodríguez-Campos (2007) and Renger and Titcomb (2002). Such models require a facilitator with logic model expertise and stakeholder involvement. Gamel-McCormick (2011) concluded, "it is clear that a logic model cannot be the sole method of assessing a program" (p. 65).

Logic models may limit how much program staff think about solutions, because the logic model represents what program staff believe the funder or evaluator wants as opposed to allowing staff to continually seek creative solutions (Hill, n.d.; Taylor-Powell & Henert, 2008). Case studies by Chen (2014) illustrated how two programs (community health and campus-based diversity enhancement) did not benefit from traditional logic models as the models failed to represent "contextual factors and causal mechanisms" (p. 343). Additionally, programs that stand to benefit the most from program planning and evaluation lack the time and resources to invest in logic model creation (Kaplan & Garrett, 2005). The logic model has garnered criticism for not representing program complexity (Renger et al., 2011). For example, Burns and Worsley state that "the problem is that solutions to problems within complex environments are constructed as if they weren't complex" (2015, p. 18). Furthermore, logic models' orderly nature and dialectic may not reflect typical Extension programs with competing needs, changing environments, and multiple stakeholders. These criticisms demand an answer to the question, is there a better way?

DEVELOPMENTAL EVALUATION

Developmental evaluation provides an alternative to logic models. A quintessential understanding of program evaluation is that formative evaluation is conducted to improve a program and summative evaluation is conducted to summarize the end results of a program. Developmental evaluation is neither formative nor summative. In developmental evaluation, the key is "adaptive development" or evaluating to adapt the program to changing contexts and/or clientele, learning that activates change, and/or emerging innovations for a dogged problem (Patton, 2016). Developmental evaluation is not a new approach; Patton (1994) formally introduced it over 25 years ago.

Patton presents eight developmental evaluation "essential principles:" (a) developmental purpose, (b) evaluation rigor, (c) utilization focus, (d) innovation niche, (e) complexity perspective, (f) systems thinking, (g) cocreation, and (h) timely feedback (Patton, 2016, p. 3). Not to be confused with "development evaluation", or the practice of program evaluation in developing countries (Patton, 2016, pp. 7-8), developmental evaluation is also known as real-time evaluation, emergent evaluation, action research, and adaptive evaluation (Patton, 2016). Despite the negative aspects of logic model development previously mentioned, many funders require their use (Kaplan & Garrett, 2005). Notably, logic model creation can be incorporated into a developmental evaluation (Zamir & Abu Jaber, 2015) so that developmental evaluation accompanies, not replaces, an accountability-based evaluation approach (Mitchell, 2019).

Developmental evaluation is rooted in utility-focus evaluation; that is, key stakeholders such as funders, innovators, and frontline staff use the results of their evaluation to inform their work and produce actionable results (Mitchell, 2019). While a logic model approach focuses on outcome measurement and accountability demands, developmental evaluation amplifies learning and innovation (Mitchell, 2019), contributes to the development of an initiative, and aids in adapting the initiative to complex situations (Fagen et al., 2011). While developmental evaluation is not a new concept, Extension has given developmental evaluation little attention. Kelsey and Stafne (2012) used the eXtension Grape Community of Practice for a developmental evaluation case study. Their work presents a model for using developmental evaluation to evaluate other eXtension Communities of Practice. Lane and Sanders (2019) used a developmental evaluation approach whereby local elected officials and Extension personnel collaborated on local strategic planning, budgeting, and governance issues.

PURPOSE

The purpose of this paper is to illuminate developmental evaluation for Extension programs, and we use the 4-H Science: Building a 4-H Career Pathway Initiative (referred to hereafter as the 4-H initiative) as a witness to the power of developmental evaluation. The initiative, conducted by the National 4-H Council, Lockheed Martin, and 13 state 4-H programs (referred to hereafter as state grantees), aimed to engage underserved youth in 4-H Science programs to increase education and career opportunities in the fields of science, technology, engineering, and mathematics (STEM). Extension 4-H professionals engaged 521 Lockheed Martin employees (serving as 4-H volunteers and referred to hereafter as corporate volunteers) and 3,679 4-H community volunteers to reach 89,291 youth contacts in STEM programs (Franck & Donaldson, 2020).

We conducted multiple elements of a process evaluation of the 4-H initiative concurrently from 2016 to 2018. The process evaluation included observations of 10 operative programs; interviews with 155 Extension 4-H professionals, 4-H community volunteers, corporate volunteers, youth participants, and parents; surveys of youth participants; and an extensive document review including review of monthly activity reports of participation numbers, demographics, and activities (Donaldson & Franck, 2018; Donaldson & Franck, 2020). In our work, we incorporated many of the uses and characteristics of developmental evaluation. Considering the scope of the 4-H initiative and the evaluation findings, we claim that developmental evaluation should have a more prominent role in Extension program planning and evaluation.

METHODOLOGY

This case study involved analyzing developmental evaluation literature and comparing those findings to the 4-H initiative findings. The 4-H initiative presents an interesting program for this developmental evaluation paper, as it reflects the "complex adaptive system" described by Patton (2011, p. 8) and is (a) nonlinear, (b) emergent, (c) dynamic, (d) adaptive, (e) uncertain, and (f) co-evolutionary. First, the initiative is nonlinear from many standpoints, including participation. For example, a participant may be involved in 4-H as a fourth grader, but not again until middle school. Second, the initiative was emergent as Extension professionals, community volunteers, corporate volunteers, and participants worked together to create new programs and infuse STEM career education into existing programs. Third, it was both dynamic and adaptive as Extension professionals changed course with their programming by adopting new strategies. Fourth, like other youth programs, 4-H Science programs face uncertainty because experienced volunteers may change the amount of time they can spend on the initiative due to work or other demands. Fifth, the initiative was co-evolutionary as Extension professionals, parents, volunteers, and youth organized programs rather than working through lockstep curriculum. As evaluators, we were part of the project from the start, working with Extension professionals and National 4-H Council representatives - a hallmark of developmental evaluation (Gamble, 2008). Perhaps most importantly for illustrating the power of a developmental evaluation mindset, the 4-H initiative reflected the dynamic nature of a typical Extension program in regards to ongoing changes in funding and staffing, community needs and opportunities, and participants' interests.

FINDINGS

The findings are organized according to Patton's five uses of developmental evaluation:

- 1. "Ongoing development or adapting an intervention to new conditions;
- 2. Adapting effective general principles to a new context;
- 3. Developing a rapid response to a major change;
- 4. Preformative development of a potentially scalable innovation, or getting an intervention ready for summative evaluation; and
- 5. Major systems change and cross-scale evaluation to provide feedback about how the intervention is unfolding and how it may need to be adapted for broader application." (Patton, 2011, pp. 21–22).

ONGOING DEVELOPMENT OR ADAPTING AN INTERVENTION TO NEW CONDITIONS

The existing National 4-H Science logic model (National 4-H Council, 2010) did not fully articulate the 4-H initiative's complexity. A developmental mindset for evaluating the 4-H initiative allowed us to discern the following insights rather than simply use broad labels from the logic model:

• 4-H traditionally has functioned well by engaging 4-H professionals and volunteers who are experts in agriculture, family and consumer sciences, and youth development. 4-H Science represents new audiences (Donaldson & Franck, 2018), and it is challenging for experienced community 4-H volunteers to fully embrace STEM projects.

- Likewise, experienced 4-H professionals were challenged to provide guidance and support to community 4-H volunteers in STEM topics.
- The 4-H initiative represented a different system. For the system to work, corporate volunteers with expertise in science and engineering had to be drawn into 4-H at both the professional level and the volunteer level. Additionally, these corporate volunteers were needed for direct teaching of youth and professional development of 4-H professionals and community volunteers.
- Youth with committed STEM interests may lack awareness of 4-H.
- To show how the 4-H initiative was working in diverse communities, we shared program profiles with state grantees. We did this to illustrate how the 4-H initiative performed successfully in different contexts and supported replication. The program profiles in Appendix A and B demonstrate how the 4-H initiative was adapted into existing programs.

ADAPTING EFFECTIVE GENERAL

PRINCIPLES TO A NEW CONTEXT

The 4-H initiative request for applications discussed the different volunteer roles that corporate volunteers would fulfill, specifically: 4-H champion, STEM program manager, community relations lead, and leaders for leadership development clubs, employee affinity groups, and volunteer clubs. In our interviews, 4-H professionals described how these roles did not exist. In fact, we identified only one state with a corporate volunteer whom 4-H professionals and corporate employees identified as their "4-H champion."

States implementing only short-term, introductory STEM programming were expected to have 10 corporate volunteers involved in the 4-H initiative. These states had 16.1 corporate volunteers on average, or a total of 161 corporate volunteers across 10 states. However, Arkansas had 70 corporate volunteers. We visited the University of Arkansas Cooperative Extension Service's office in Ouachita County and observed 4-H programming with the Camden Fairview School District. Our research demonstrated how corporate volunteers were engaged; specifically, the high school technology classes used the Project Lead The Way curricula supplemented with 4-H curricula to create an interactive and immersive learning environment.

If we had evaluated from a traditional logic model approach, we would have assumed that Arkansas's success came from following the volunteer roles described in the request for applications. Notably, we would not have invested additional time and energy in understanding Arkansas's success. See Appendix B for the program profile describing the Arkansas approach. **DEVELOPING A RAPID RESPONSE TO A MAJOR CHANGE** During the project's first year, our evaluation identified a lack of professional development and 4-H curricula covering STEM careers. The National 4-H Council responded by contracting with Click2SciencePD and Couragion. Click2SciencePD is an online, targeted approach to professional development created specifically for out-of-school-time programs. Couragion is an online curriculum that uses videos, games, and self-reflection quizzes to help youth explore STEM careers. The National 4-H Council also promoted the Build Your Future curriculum to state grantees for college and career readiness. This adaptation could have contributed to exceeding overall benchmarks for youth reach, community volunteerism, and corporate volunteer engagement.

We believe that greater usage of developmental evaluation would have improved the program outcomes. In developmental evaluation, the measures and performance goals evolve as the program unfolds. In the case of the 4-H initiative, we noted that several 4-H professionals were preoccupied with achieving the benchmark numbers, but they may have missed the mark on deeper and more meaningful youth engagement, especially with girls and minorities. As an illustration, California 4-H professionals arranged internships for three participants. One of the youth presented her internship experience to her 4-H STEM Club's members and parents. While the internships were few in number, they provided a more impactful experience than other, large group experiences that had high turnout but limited effect. During the 4-H initiative, it would have been instructive to reframe the benchmarks from the number of girls, minorities, and total youth engaged to the number of girls and minorities engaged in projects that lasted 6 months or longer. Looking back, face-to-face annual meetings among state grantees would have improved professional learning, especially peer-to-peer learning and goal-setting for the coming year. This also could have informed the evaluation, allowing us to pinpoint state grantees' priorities and how best to track and measure those while identifying opportunities for innovation and learning.

PREFORMATIVE DEVELOPMENT OF A POTENTIALLY SCALABLE INNOVATION, OR GETTING AN INTERVENTION READY FOR SUMMATIVE EVALUATION

Typically, a program's logic model guides the program evaluation by documenting the number of outputs and measuring the achievement of outcomes. This has critical implications, including an acceptance of the assumptions stated on the logic model. In the case of the National 4-H Science logic model (National 4-H Council, 2010), the assumptions are: "4-H reaches diverse population; and increased awareness of science skills, content, and career possibilities increases engagement of youth in a science career." By taking a developmental mindset, we tested these assumptions. On a monthly basis, state grantees completed activity reports that showed participation numbers for youth, community volunteers, and corporate volunteers.

However, this focus on numbers rather than quality tended to mask innovative ideas that needed time to implement before outcomes could be achieved. For example, several states spent time building relationships with volunteers, volunteer organizations that targeted underrepresented groups of scientists, and other agencies to build their 4-H STEM programs. These relationships were effective methods for building strong programs, but because of the time investment, these efforts often were overlooked in reporting because they did not result in immediate youth engagement. Furthermore, other states who did not meet outcome benchmarks often expressed feelings of disengagement from program goals and their ability to meet those goals in a meaningful way.

MAJOR SYSTEMS CHANGE AND CROSS-SCALE EVALUATION TO PROVIDE FEEDBACK ABOUT HOW THE INTERVENTION IS UNFOLDING AND HOW IT MAY NEED TO BE ADAPTED FOR BROADER APPLICATION The National 4-H Council provided the 4-H STEM Career Pathway (Figure 1) to state grantees as an overall visual of the 4-H initiative. This scheme outlined 4-H youth activities and Lockheed Martin employee contributions.

Yet, 4-H professionals reported that the 4-H STEM Career Pathway needed greater development; representative comments included:

- "I would love to see the pathway a little more developed and articulated. We spent a lot of time talking about what's the difference between learn and practice." (California 4-H professional)
- "I think semantics or definitions need to be clearer." (Texas 4-H professional)

To make the 4-H initiative suitable for broader application, we proposed to the National 4-H Council to convene a working group, a committee of five professionals representing three land grant universities and the National 4-H Council in addition to ourselves (the two evaluators). Of the seven working group members, five had been involved in the initiative and two had not. These different perspectives provided valuable counsel on enhancing the career pathway as a tool to positively impact the entire 4-H movement. From this group, the enhanced 4-H STEM Career Pathway was cocreated and informed by the evaluation's key findings. Like other 4-H initiative course corrections described herein, the enhanced 4-H STEM Career Pathway represents a product of a developmental evaluation mindset (Figure 2).

Developmental Evaluation for Extension



Figure 1. 4-H STEM career pathway at project initiation. *Source:* From "4-H Science: Building a 4-H Career Pathway Initiative – Final Evaluation Report," by J.L. Donaldson and K.L. Franck, 2018, Publication No. W668, University of Tennessee Extension. Reprinted with permission.

4-H STEM Career Pathway for Youth Success

Growing a Generation Prepared to Succeed in Life & Career

	Explore	Learn	Practice	Career Experience
Youth Grade in School	- All Grades		8-12 th Grades	
Milestones	Youth explore concepts to develop awareness in STEM, college and career readiness for 21 st Century success.	Youth learn skills and abilities in STEM, college and career readiness for 21 st Century success.	Youth practice and apply real world skills and abilities in STEM, college and career readiness for 21 st Century success.	Youth gain career experience in STEM that informs their college and career decisions for 21 st Century success.
Outcomes	 Youth will: Express interest and be engaged in science related activities. Express positive attitudes about science. 	 Youth will: Demonstrate a capacity for science process skills. See science in their futures and recognize the relevance of science. Express positive attitudes about engineering. Demonstrate a capacity for engineering skills. 	 Youth will: Draw connections to real-world concepts and situations.^a Discuss STEM careers and their educational pathways.^a Apply science skills to issues in their community. Make contributions to their peers, families, and communities. 	 Youth will: Demonstrate professional communication appropriate to the academic and workplace context. Demonstrate the social, emotional, character, and leadership skills necessary for academic or workplace success. Make informed decisions about college aspirations that are personally meaningful. Make informed decisions about career aspirations that are personally meaningful.
^a These outcom	nes are from: Pechman, E.M., Mie	elke, M.B., Russell, C.A., White,	R.N., Cooc, N. (2008). Out-of-Sc	hool time (OST) observation

^a These outcomes are from: Pechman, E.M., Mielke, M.B., Russell, C.A., White, R.N., Cooc, N. (2008). *Out-of-School time (OS1) observation instrument: Report of the Validation Study*. Washington, DC: Policy Studies Associates. All other outcomes are from National 4-H Council Common Measures (2017)

Figure 2. 4-H STEM career pathway at project conclusion. *Source*: From "4-H Science: Building a 4-H Career Pathway Initiative – Final Evaluation Report," by J.L. Donaldson and K.L. Franck, 2018, Publication No. W668, University of Tennessee Extension. Reprinted with permission.

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

As pointed out by Franz et al. (2014), Extension does need to embrace new evaluation approaches. We believe developmental evaluation is important for Extension because it aligns well with the evaluation needs of Extension programs and professionals as demonstrated by this 4-H initiative case study. A developmental evaluation mindset helped us be responsive in this large-scale, 13-state 4-H initiative. Likewise, we believe developmental evaluation would be advantageous for Extension programming given the changing contexts driven by demographic, technological, and social changes. As a case in point, consider 4-H. The contexts for all 4-H programming are in flux from transformations caused by the COVID-19 pandemic (Arnold & Rennekamp, 2020) and modern youth movements such as #blacklivesmatter (Webster, 2016).

To be sure, we are both experienced program evaluators who have used and continue to use program logic models to guide Extension program planning and evaluation. Logic models are advantageous when accountability is a paramount need. However, developmental evaluation has an important role in adaptive situations to improve a "work in progress" (Brinkerhoff, 2002). Key questions Extension professionals should consider include:

- Are Extension clientele changing?
- Are the contexts for Extension programs changing such as shifting from in-person to virtual formats?
- Do Extension programs produce learning and innovations for persistent community issues?

If the answer to any of these questions is yes, then experts and practitioners should invest in developmental evaluation. Extension evaluators need to conduct more case studies of logic model creation, logic model usage and non-usage, and developmental evaluations. Likewise, we recommend user guides and other Extension publications to expound on how to use developmental evaluation at the local level. This will improve responsiveness and help Extension professionals and communities hammer out evaluation processes and practices (Dunkley & Franklin, 2017). Local Extension agents and other practitioners, Extension evaluation specialists, faculty, and Extension stakeholders need to collaborate in using developmental evaluation for local and state Extension initiatives. A preponderance of evaluation work in Extension aims to show program impact. Developmental evaluation could be the key to improving programs in order to consistently achieve impactful results. Developmental evaluation, with its systems thinking and cocreation, is a mechanism for improving Extension programs for individuals and communities.

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APPENDIX A. ADVENTURES IN SCIENCE

LOCATION

Montgomery County, Maryland

PROGRAM CONTEXT

Target audience	Youth in the Washington DC suburbs	
Age range of participants	8 to 15 years	
Curricula	Numerous – varies by presenter	
Lead partners	Lockheed Martin, National Institutes of Health (NIH), National Institute of Stan- dards & Technology (NIST)	

PROGRAM DESCRIPTION

Adventure in Science (AIS) is a hands-on science education activity for children ages 8–15 running on Saturday mornings from late October to March. Since the early 1990's the Montgomery County 4-H Program has provided an administrative framework for Adventures in Science, using 4-H University of Maryland Extension (UME) volunteers as site managers. Each Saturday, youth gather at one of four locations to learn a new topic from a STEM professional.

AIS teachers and site managers are all volunteers who share a passion for science and working with students to share that fun and excitement. Volunteers are recruited from staff of our host science institutions (NIH, NIST, Lockheed-Martin, etc.), from local universities and science corporations, and from parents of the AIS students. Most teachers volunteer for only one Saturday, but some return for several sessions or teach a particular class at different AIS locations.

This program has been very popular, with a waiting list for participation. A particular success of this initiative has been the appeal to a diverse group of youth not involved with other 4-H programming efforts.

EXPECTED PROGRAM OUTCOMES

Explore

- Express interest and be engaged in science-related activities.
- Express positive attitudes about science.

Learn

- Demonstrate a capacity for science process skills.
- See science in their futures and recognize the relevance of science.
- Express positive attitudes about engineering.
- Demonstrate a capacity for engineering skills.

OTHER PROGRAM INFORMATION

For more information visit http://www.adventureinscience.org

Program Contact

Alganesh Piechocinski, Senior Agent, Educator University of Maryland Extension, Montgomery County, MD 18410 Muncaster Road, Derwood MD 20855 301-590-2804 algapie@umd.edu

APPENDIX B. PROJECT LEAD THE WAY AND 4-H STEM PARTNERSHIP

LOCATION

Arkansas

PROGRAM CONTEXT

Target audience	High school youth
Age range of participants	14 to 18 years
Curricula	Project Lead The Way curricula and numer- ous 4-H Science curricula including Lego* Mindstorms* and Junk Drawer Robotics
Lead partners	Lockheed Martin Corporation and Camden Fairview School District

PROGRAM DESCRIPTION

The high school technology classes in the Camden Fairview (Arkansas) School District use the Project Lead The Way (PLTW) curricula supplemented with 4-H curricula to create an interactive, experiential learning environment. PLTW provides both professional development for teachers and real-world learning for students. In the words of one technology faculty member, PLTW represents the "...best class I have ever taught in my life. It offers the students direction for going into different areas of engineering. It provides them with knowledge that they really need for the outside world. It helps prepare them for college or for a job."

EXPECTED PROGRAM OUTCOMES

This in-school partnership provides a range of experiences for youth. The PLTW focus is on activity-, project-, and problem-based instruction which pairs well with 4-H. This program supports these 4-H Science Career Pathway outcomes:

Explore

- Express interest and be engaged in science-related activities.
- Express positive attitudes about science.

Learn

- Demonstrate a capacity for science process skills.
- See science in their futures and recognize the relevance of science.
- Demonstrate a capacity for engineering skills.

Practice

- Draw connections to real-world concepts and situations.
- Discuss STEM careers and their educational pathways.

Experience

- Demonstrate professional communication appropriate to the academic and workplace contexts.
- Make informed decisions about college aspirations that are personally meaningful.
- Make informed decisions about career aspirations that are personally meaningful.

MORE INFORMATION

The following resources are provided for additional information.

- Project Lead The Way: https://www.pltw.org/
- Junk Drawer Robotics: https://4-h.org/parents/ curriculum/robotics/
- University of Arkansas Cooperative Extension Service in Quachita County: https://www.uaex.edu/ counties/ouachita/

Program Contacts

- Dr. Angie Blacklaw-Freel, Interim Associate Department Head, 4-H & Youth Development, University of Arkansas, afreel@uark.edu
- Keri Weatherford, County Extension Agent and Staff Chair, University of Arkansas Cooperative Extension Service, kweatherford@uaex.edu

Engaging Corporate Partners to Build Your 4-H Program: Tips for Success

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Abstract. This article discusses best practices learned from a corporate partnership between Bayer, 4-H county programs in Missouri, New Jersey, and Pennsylvania; and National 4-H Council. This corporate partnership has blossomed into a multi-level engagement that is offering unique opportunities for both Bayer and 4-H programs at the local and state level. Authors share lessons learned that can be utilized for colleagues to leverage mutually beneficial corporate partnership to expand their work in the community.

INTRODUCTION

Following trends in higher education, Extension is employing fewer staff members than in previous years; this has changed 4-H implementation plans at both the state and county levels (Gillespie & Kinder, 2010). Consequently, 4-H professionals must maximize their resources and devise creative ways for 4-H programming to continue to meet the needs of communities. One strategy is leveraging corporate partnerships. Corporate partnerships can elevate 4-H programming in many ways, from engaging new volunteers to supporting program fundraising goals (Pritchett et al., 2012).

In 2016, Bayer and the National 4-H Council launched Science Matters, a program geared to develop a partnership with 4-H in five targeted communities. This model of partnership—supported by National 4-H—connects corporations to local 4-H programs as a way to provide positive youth development experiences and serves as a gateway for Extension professionals to explore opportunities for corporate engagement.

The partnership between Bayer and 4-H has enhanced community development through project-based learning experiences that enable youth and corporate employees to explore community-based issues and solutions. Additionally, it has provided 4-H professionals with an opportunity to share best practices that may help others who are considering using corporate partnerships to increase their capacity. This article discusses the rewards and challenges to corporate partnership models from the experiences of the state leads using the Science Matters program as an example of a successful partnership. The authors share lessons they learned from the experience that other Extension professionals can apply to their own contexts to develop and nurture corporate partnerships.

AN EXAMPLE OF CORPORATE ENGAGEMENT

The goal of the Science Matters program is to equip 25,000 youth with the tools and support needed to deepen their understanding of agriscience and provide resources to support a continued interest and passion in Science, Technology, Engineering, and Math (STEM) education. For two years, small grants were given to 4-H programs, and state leads were connected to a Bayer employee point person to support partnership building.

Bayer volunteers invited youth to their facilities, where they could visit manufacturing labs, participate in career panels, learn about current Bayer projects, and interact with Bayer volunteers. Bayer volunteers worked alongside youth participants to teach what they learned through hands-on workshops and showcases in their community. Bayer provided scholarships for youth to attend the National 4-H Youth Summit on Agri-Science where youth gained a broader perspective of modern agriculture, related careers and the challenges of feeding a

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growing world population. As a result of this partnership, youth have developed life skills, gained new perspectives about science and agriculture, and have been inspired to tackle world issues.

Since the initial two-year program, Science Matters has grown into a multifaceted partnership for Bayer and 4-H. Bayer continues to be involved locally with the 4-H programs they supported initially, leading STEM workshops at 4-H fairs and other community events. In many states, Bayer continues to offer facility tours for youth and families and provide sponsorships for local 4-H projects, including fireworks at the county fair and resources for a 4-H community garden.

LESSONS LEARNED

To better navigate partnership building with Bayer, state leads shared ideas and lessons learned at monthly meetings with the National 4-H project manager and each other. Managing the Science Matters program has provided the state leads with relevant experience to continue to navigate corporate partnerships to support a growing 4-H program. Some examples of other corporate partnerships developed by the state leads include those with Apple, Wiley, Oil Region Alliance, Optum, Nutrien, Lockheed Martin, Walmart, and TD Ameritrade. Some of these partnerships have been leveraged by the support of the National 4-H Council, while others have been developed through direct outreach of 4-H professionals.

Through this work, state leads have realized several best practices for building and sustaining corporate partnerships. These practices inform professionals for beginning and sustaining partnerships to be mutually beneficial for both the corporate partner and community organization. The tips below come from a collection of reports and the debrief meetings from both state leads and corporate collaborators.

- **Consider that corporate volunteers may not have experience working with youth.** 4-H has existing resources to train adults in positive youth development, curriculum planning, experiential learning, and youth safety, which can be tailored to train corporate volunteers.
- **Recognize the content-based skills that our corporate volunteers can share.** These can include skills they use in their everyday work or those used for unrelated hobbies. Share relevant curricula that can help volunteers teach effectively (Ripberger & Blalock, 2015).
- Corporate volunteers often have comp time. In many cases, corporate volunteers can spend a set number of hours during the work week to volunteer without using sick leave or other limited options for paid time off (Grant, 2012).
- All volunteers like to be recognized for their efforts. Traditional 4-H volunteer recognition strategies, like certificates and thank you cards, work well. It is a great idea to also recognize the company by using their logo on marketing materials or tagging them on social media.
- **Corporations often have budgets available to support community projects.** Do not underestimate the time and resources it takes to manage volunteers and coordinate programs. It is appropriate to ask for funding or greater in-kind support for supplies, corporate-sponsored catering, or other needs.
- Think outside the box when offering volunteer opportunities. Consider engaging volunteers in short-term projects like judging, leading a workshop, and presenting on a career panel.
- **Partnerships are mutually beneficial**. All parties benefit by sharing resources and expertise to achieve greater impact. Corporate volunteers often feel fulfilled when giving back to their community; community organizations benefit from enhanced programming. To get started in this type of partnership, 4-H professionals should consider what companies in their community may align with their program goals (Brockner, 2014).
- Setting realistic goals for everyone's time. When partnerships evolve, it can be tempting for volunteers, staff, and youth to want to "do it all," which can cause burn out. Be sure to help manage realistic timelines and expectations for all.

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CONCLUSION

The partnership between Bayer and 4-H has made a positive impact on 4-H programs by providing youth with new experiences and county programs with additional resources to lead positive youth development programming. Valuable lessons learned inspired new corporate partnerships in several communities. 4-H professionals need to find creative solutions to remain effective in growing positive youth development experiences, and corporate partnerships serve as a viable solution to expand 4-H programming to a greater audience with meaningful, research-based programming.

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