horticulturae

MDPI

Article

Program Evaluation of a Workshop on Prairie Strips for Farm Advisors: Framing the Co-Occurring Outcomes of Low Knowledge Acquisition and High Confidence

Rachael Whitehair [1,2], Nancy Grudens-Schuck [1,*] and Lisa A. Schulte [3]

[1] Department of Agricultural Education and Studies, 513 Farmhouse Lane, Iowa State University, Ames, IA 50011, USA
[2] Nebraska Corn Board, 245 Fallbrook Blvd., Suite 204, Lincoln, NE 68521, USA
[3] Department of Natural Resource Ecology and Management; Bioeconomy Institute, 617 Bissell Rd., Iowa State University, Ames, IA 50011, USA
* Correspondence: ngs@iastate.edu

Abstract: The agricultural conservation practice of prairie strips is new and novel. Prairie strips planted in row crop fields warrants greater adoption because the application decreases erosion; protects water quality; and supports habitat for wildlife and biodiversity, including pollinators. Prairie strips are a vegetative practice composed of diverse, native, and mostly perennial species that, as a community, follow principles of ecological succession; however, they must be managed for success. Farm advisor comprehension of practice characteristics is key for adoption by producers and landowners. This article reports on a developmental evaluation of workshops intended to change farm advisor knowledge, skills, and confidence related to prairie strips management for use in consulting with farmers and landowners. The study used pre-post instruments of knowledge and skill focused on prairie species identification and age of prairie strips planing; pre-then post-end of session questions were asked in a survey to report change in knowledge, skill, and confidence, as well as farm advisor situation. Advisors reported increased confidence, but acquisition of prairie knowledge and skills resulted in flat to lower scores. The paper explores the discrepancy of lower cognitive scores (knowledge and skills) compared to higher confidence. Explanations explore the phenomena of satisficing and perceived self-efficacy to explain the differential.

Keywords: Bloom's taxonomy; corn belt; adult education; perceived self-efficacy; perennial plantings; plant identification; developmental evaluation; soil conservation; water quality; biodiversity

Citation: Whitehair, R.; Grudens-Schuck, N.; Schulte, L.A. Program Evaluation of a Workshop on Prairie Strips for Farm Advisors: Framing the Co-Occurring Outcomes of Low Knowledge Acquisition and High Confidence. *Horticulturae* **2022**, *8*, 1215. https://doi.org/10.3390/horticulturae8121215

Academic Editor: Laura Warner

Received: 11 October 2022
Accepted: 10 December 2022
Published: 19 December 2022

1. Introduction

Corn and soybean cropping systems dominate row crop agriculture in the U.S. While these systems are highly productive, they also contribute to resource degradation, the cost of which has largely been borne by government and society [1]. Row crop agriculture is "associated with loss of native habitat and contingent biodiversity; degradation of air, water, and soil quality; and declines in rural communities" [2]. Additionally, the conversion of native ecosystems to agriculture and subsequent homogenization and industrialization of agricultural systems has led to widespread declines of native pollinators [3] and birds [4]. The Midwestern states of Iowa and Illinois are, respectively, the top producers of corn and soybean and, along with other contiguous states, contribute to non-point source pollution of a major national waterway, the Mississippi River Basin [5,6].

1.1. Policies and Practices

Conservation lands use technologies, such as conservation tillage (e.g., "no-till"), terraces, filter strips, and riparian buffers to lessen nonpoint source pollution from normal agricultural practices, but the lower number of acres treated with conservation practices

limits successful mitigation [2,5,6]. The voluntary principle with respect to technology adoption has been affirmed at the federal (including successive U.S. Farm Bills), state, and local levels, including courts of law [5,6]. Voluntary adoption or adaptation of technology endeavors to engage farm organizations and farm advisors, including in professional development [7,8]. Nonprofit agricultural, environmental, and conservation organizations have increased in sophistication and reach to farmers, landowners, and communities in service to voluntary adoption of agricultural conservation [9–12]. Organizations have strengthened their ability to help farmers for example, by hiring more biologists with soil and water conservation credentials and by seeking external funding.

1.2. Background

Prairie strips are a linear vegetative practice composed of perennial, tall grass prairie species that include native C3 and C4 grasses, sedges, rushes, legumes, and forbs [1,13]. A mix of species is planted as one or more 30–120 foot strips in a field—where they remain for 10 or more years as shown in Figure 1. The design for successful implementation of prairie strips became available in 2014 after catchment-scale trials [1]. Prairie strips were developed in Iowa by an interdisciplinary team, Science-based Trials of Rowcrops Integrated with Prairie Strips (STRIPS), with members from multiple university research units at Iowa State University, Neal Smith National Wildlife Refuge, USDA Forest Service, and the USDA Agricultural Research Service; they subsequently expanded to include the University of Northern Iowa Tallgrass Prairie Center and farmer nonprofit organizations, among others [1]. The team acknowledges eight institutional partners, 32 supporting organizations, and 18 organizational members of a stakeholder committee [14]. In 2022, the team reported activity in 15 states, with over 15,000 acres of prairie strip planted, and approximately 150,000 acres protected by prairie strips [14].

(**a**)

(**b**)

Figure 1. Two views of prairie strips at different anonymized locations in Iowa, USA (**a**) Aerial view of prairie strips (lighter color) and corn (darker color). White represents roadway. (**b**) Close-up of prairie strips, 2–3 years after establishment, with purple wild bergamot (*Monarda fistulosa*) at bottom of photo; and gray-headed coneflower (*Ratibida pinnata*) (yellow) in abundance. Photos ISU STRIPS.

Prairie strips provide benefits to the environment and the farm operator in more than one domain. The strips act as filters when seeded perpendicular to water flow and provide habitat for pollinators and other wildlife [1,15]. The ability of strategically placed prairie to control sediment and nutrient loss from no-till agricultural systems is documented in numerous papers from several disciplines [15,16]. Over a four-year period, researchers observed a 96% sediment trapping efficiency among treatments containing some amount of prairie at the original research watershed-scale sites in Iowa [13]. Recent work substantiates filtering of fecal bacteria, such as from applied livestock manure, in a simulated indicator study of prairie strips [17]. Incorporation of prairie near and within row crop fields can positively affect the abundance of native birds [18]. Pollinators were found to benefit from establishment of prairie strips in row crops [19]. Bees, for example, were found to benefit from strips, especially from the native plant species *Ratibida pinnata* and *Zizia aurea* [19].

Barriers to adoption of agricultural technologies include cost, which are present in nearly every framework for adoption. Research on costs of prairie strips include: studies that examine usage; seed mixes, which can vary in price; and mowing during establishment years [20,21]. Supports from government and nonprofits for prairie strips steadily increased from 2014 to include a major endorsement of authorization by the 2018 U.S. Farm Bill. Appropriations through USDA Farm Service Agency's (FSA) Conservation Reserve Program (CRP) denoted Conservation Practice (CP) 43. Additional supports, such as an Agronomy Technical Note [13], clarifying the deployment of prairie strips through the USDA Natural Resource Conservation Service's Environmental Quality Incentives Program (EQIP) in Iowa provide separate but parallel support.

1.3. Communication and Educational Programming

Information about use of prairie and grasses on farms was already known by many in the Midwest farming community because of nonprofit prairie restoration and seed preservation organizations, but mainly as self-supported restoration of remnant prairie, and also as government-approved plantings of CRP grasslands on whole fields.

Knowledge about prairie strips was centralized at first due to the Iowa base of research. It was not known at the time whether different tallgrass ecosystem conditions would support the prairie strips practice, its different native species compositions, and its pairing with crops. The perennial character of prairie and succession meant that multiple years of research and demonstration were needed to test adaptation to states and regions beyond Iowa. Farm advisors were not yet highly informed about the practice when outreach began.

1.4. Farm Advisors

Farm advisors are assigned a role in social change frameworks as change agents, or as communication professionals or intermediaries [7–10]. Rogers' Diffusion of Innovation (DOI) model, which has been applied across different industry sectors globally, mainly begins after innovators release an innovation [22]. Needs assessments and research on marketing may occur before the innovation is developed, and before the DOI model comes into play.

The Agricultural Knowledge and Information System (AKIS) [23,24], also applied worldwide, involves farm advisors and researchers at the stage of "product development" characterized as systems-wide problem solving and needs assessment. The model includes investigating political and social problems related to the agricultural issues, for example, social and historical pressures related to water quality problems. Neither the DOI nor the AKIS approach to agricultural innovation is static or unidimensional.

Content knowledge and skills are valued attributes of farm advisors under either system, and rapidly updated knowledge and skills are essential. While cognitive aspects of farm advisors work may be prioritized, communication elements are a strong feature of both DOI and AKIS frameworks. Both frameworks value communicative tasks. Many producers and landowners utilize the services of multiple farm advisors in addition to extension, or they may exclude extension. This trend sits alongside data that indicate

that cooperative extension field staff are no longer the most numerous advisors, although they enjoy a reputation as especially trusted sources of conservation information [10]. Producers in Iowa have used services of farm advisors in the areas of pest management and agronomy more than conservation, as documented in the annual statewide Iowa Farm and Rural Poll [25]. Most numerous in the Midwest are staff employed by the USDA Natural Resources Conservation Service (NRCS) and associated approved contractors such as Technical Service Providers (TSPs). In the Midwest, other government agencies working in the agricultural conservation area include Soil and Water Conservation District and other state agencies. Staff from conservation and environmental nonprofits, such as Pheasants Forever and The Nature Conservancy, and agricultural organizations such as the Iowa Soybean Association and Practical Farmers of Iowa, also play a role in farm advising.

1.5. Identity and Emotional Aspects

Less frequent in the literature is the discussion of farm advisor professional identity, which weds emotion, skills, and practice. The question was raised by researchers: are farm advisors technical workers or professionals? [26] Are they told what to do or do they manage work independently, including complex affective situations? Farm advisor identity and what it meant to serve in a farm advisory capacity was a topic of research in four countries [26]. The researchers established that professional development that asked farm advisors to specifically reflect on leadership, and professional roles, led to improved satisfaction, underscoring the affective or emotional aspect of the farm advisor livelihood. While the need for continued professional development may seem inevitable and beneficial for farm advisors, the reception of programming intended to change points of view by an audience through new professional development can impact attendees in an unknown manner [23]. Professional development needs, if solely defined by others, can be dismissed, ranked low, or entered into with low motivation. Even when participating in setting needs, priorities between supervisors, leadership, and advisors may differ. The Conservation Practitioner Poll [15] of NRCS and a nonprofit staff from six Midwest states showed that staff were interested in professional development in key content areas such as wildlife habitat and precision agriculture. However, content area ranked especially important by both DOI and AKIS frameworks, i.e., communication, marketing, and assisting behavior change, was ranked the lowest in the survey [27]. The survey pointed to the advisability of a greater discussion regarding programming and whose needs programs served.

1.6. Background of the Study

The evaluation focused on the "Become a Prairie Strips Consultant" program, which provided a three-part series for farm advisors in the Midwest to introduce the innovation of prairie strips. Advisors would be expected to coach farmers and landowners to establish prairie strip on their own operations. The purpose and aims of the study were to conduct a developmental program evaluation [28] of part 1 of the series, which was a workshop conducted at several sites. The Consultant program was offered from 2017 to 2019. Part 1, a daylong workshop, was required of participants before entering part 2. With part 2, program participants developed a communications and marketing project for independent advertising or website development related to prairie strips; team members reviewed content and provided feedback relative to the accuracy of science and economics content on prairie strips. Part 3 was a project where a participant was paired with a member of the prairie strips team to plan and establish prairie strips on a farm

Consultant Program Learning Objectives

- Farm advisors will be reminded of the broader issues related to farm-related environmental impacts of row crop agriculture and the warrant for conservation in Midwest agriculture;
- Farm advisors will learn specific knowledge related to prairie strip performance in areas of environmental impacts;
- Farm advisors will be introduced to research on crop-prairie strip interactions;

- Farm advisors will learn to recognize prairie plants, combinations of plants, and age of prairie strips;
- Farm advisors will calculate economic and financial costs of prairie strips;
- Farm advisors will work as a team to site prairie strips using case studies and maps;
- Farm advisors will problem solve with staff and each other about approaches to discussing prairie strips with farmers and landowners; and,
- Farm advisors will share resources for seeds, seed calculators, and county resources.

2. Education and Evaluation

Design of professional development for adult learners draws on adult program planning theories and frameworks. Daffron and Caffarella [29] provide a model for overall structure of adult program planning consisting of seven learning components, seven administrative tasks, and five assumptions to arrive at 19 choices of elements to include in different combinations. "Curriculum and instruction" is the element often thought about the most, although it is only one of 19 crucial to success. Program planning elements are founded on well-regarded educational theories, such as Bloom's cognitive categories taxonomy of educational objectives [30]. Bloom's taxonomy is sometimes considered only to be relevant for memorization and application, but this is an underappreciation of cognition and the taxonomy. Higher elements can be part of programs, and may be measured, as well. A study in China [31] showed that more advanced training, geared toward the upper levels of the Bloom hierarchy, allowed farm advisors to act more effectively in a pest management capacity when training focused on complex ecological topics that required evaluative thinking and meta-cognition. More complex training was more successful and more popular with farm advisors than formulaic training [31].

Successful development of professional identity and competence relies equally on the affective, or emotional, domain. Bandura [32,33] settled many aspects of the motivational and goal-orientation elements of his social cognitive theory, especially the concept of "perceived self-efficacy," which is often stated as "confidence." Goal attainment is the domain closer in definition to self-efficacy (not generalized self-esteem or overall confidence associated with personality). Self-efficacy, a practical construct, is associated with an individual's perception of success in a *specific area of functioning*, such as farm advising or another area of work or life. Perceived self-efficacy could be different for each of these areas for a given individual. Actual functioning might differ from what the individual perceives. Parts associated with self-efficacy include ingredients such as mastery, vicarious experiences, social persuasion, and the emotional states. Self-efficacy also can be extended to individuals in one's network, called collective self-efficacy [33]. One might feel more confidence about their ability to complete a task if one's neighborhood or workmates can be counted on to assist. One might not judge oneself 100% capable, even in the long term, in performing in a way that succeeds with a goal. However, with respect to a task or goal, collective action might lead to success, and people take this into account in their sense of competence and confidence. This is a key element in social agency and collective action [33–35].

Program Evaluation Frameworks

Program evaluation theories, similar to educational theories, are often mixed together in the field setting. Outcome-based evaluations, which use a schema such as a program logic model, may be recommended or required in extension, and the concepts are common regardless [8]. Formative and developmental evaluation [28] are intended for projects which feature high risk or novel innovations in programs or interventions. Developmental evaluation [28] provides overarching aspects of the design rather than methods. Development evaluation can be applied in one of five ways, including assisting understanding of technology that is set for "broad-impact, scalable innovation" [20] (p. 362). The evaluator's role is not external and definitive, but intended to pose questions and alternatives based on data, "the evaluator's primary function in the team is to elucidate team discussions with evaluative data and logic [20] (p. 319). Developmental evaluation encourages evaluators

and leadership of the program, and even participants, to discuss the findings from a broad range of perspectives, including from beyond the range of the typical output-outcomes logic chain [19]. Developmental evaluators' share mission-based findings during, as well as after, the program; and they urge staff to adjust the program accordingly and quickly, similar to formative evaluation. There is no restriction to wait until a new program cycle to change the specifics of the program [21]. Studies using a developmental approach [36] look keenly for inconsistencies, examine data early for opportunities for discussion about unusual results, and make results available to the groups, even participants, to gain greater understanding, such as studies in FARMSCAPE in Australia, rural development in the U.S.A, and in sustainability studies [37–39].

3. Materials and Methods

3.1. Program Administration

We advertised seven part 1 workshops that were scheduled in different regions of Iowa including one two-hour pilot and a six day-long workshop (Table 1). The pilot session and first daylong workshop (second pilot) led the team to refine the curriculum by adding a team siting activity with several maps, drawing materials, and an original case study of a composite farm. We also added artifacts for the prairie identification unit, such as fresh plant samples, and custom-made posters of key look-alike species. We refined the pre- and post-test that assessed advisors' ability to determine the health and successional age of prairie plantings. One workshop was canceled due to low registration. Ninety-one total people attended across six events (including the two-hour and day-long pilots). Four workshops were considered sufficiently similar that they were "high fidelity" across sites for the purposes of aggregation. These four workshops were used to conduct the evaluation with a population of 48. The evaluation used a census not a sample approach; census is typical of outreach program evaluation of this size.

Table 1. Workshop locations in Iowa, length, date in 2018, and number of attendees.

Location	Date	Registrants
Scheman Building, Ames (pilot 1) (2 h)	5 February	29
Wallace Learning Center, Lewis (pilot 2) (Day-long)	12 July	14
Dairy Education Center, Calmar (Day-long)	3 August	13
Clock Tower Business Center, NIACC [1], Dubuque (Day-long)	11 September	11
Hawkeye Community College, Waterloo (Day-long)	17 October	8
FFA Enrichment Center, DMACC [2], Ankeny (Day-long)	2 November	16

Note: One workshop was canceled due to low registration. The location is not provided. [1] Northeast [STATE] Community College (NIACC). [2] Des Moines Area Community College (DMACC).

3.2. Evaluation

A pre- and post-test instrument was used during the workshop to assess individual acquisition of knowledge and skill to evaluate the age of a prairie planting (i.e., ecological succession) within the early years of establishment (1–4 years). Evaluation is a more advanced aspect of cognitive process dimensions and presumes knowledge in the "earlier" or foundational dimensions of "remember" and "understand" [30] necessarily for accuracy in evaluation. As a set, the photo samples of prairie strips from research and collaborator farmer and landowner sites were developed by a team of five planners for clarity and representativeness of ecological succession, and available seed mixes. The team developed a set of eight separate, numbered photos of a prairie strips planted in a crop (corn or soybean). The photo did not reveal the age (in years) of the planting. The photos were piloted and edited based on test results and feedback from participants after the first pilot workshop. Participants privately and independently matched each photo with the correct season and age (year) options listed on a separate worksheet. Pretests and photos were collected without names and stored. Participants were not provided the key to the photos at the time of the pretest. Participants then engaged in the workshop. Following exposure to

the curriculum, participants were given the identical post-test which was collected without names. Photos were then reviewed with a key and discussed as a group using a projector and screen. Participants knew their scores when the post-test was completed.

3.3. End-of-Session Survey

We sent an end-of-session Qualtrics (2017) survey using professional standards for frequency of contact and email messaging [40]. The data were sent to all participants using a census rather than a sampling approach. The end of session survey asked about satisfaction, self-report learning gains, personal information including opportunities, and a self-efficacy-style confidence question. In the survey, we used three types of question formats: (a) Likert-type declarative statements with a declarative (word) scale; (b) retrospective self-reports, with Likert-type declarative statement with a declarative (word) scale (such as "none, some, many") and (c) check all that apply statements [40]. Twenty-two Likert-style questions asked advisors to report on (1) changed skills and confidence related to prairie strip consulting, (2) effectiveness of prairie artifacts and photos, and (3) workshop value and performance. Questions regarding changed skills and confidence (self-efficacy) are primarily based on the "perceived change" (or post-then-only) method [41]. Questions asked respondents to self-rate their skill aptitudes before and after the workshop in (a) siting ability and (b) ability to assess the age of a prairie strip planting. In addition, the survey requested information (not retrospective post) about current attitudes and potential client communication on the prairie strips practice, and preferences regarding support they currently received from universities or their own organizations. The survey results were summarized using descriptive statistics across workshops that provided similar instruction (fidelity).

Retrospective self-report questions utilized a "retrospective pretest" methodology [33]. The questions are presented in pairs ("Now" and "Before") during the end-of-session period of the evaluation. They are considered to be more valid for certain types of constructs, especially for constructs that the participants may not comprehend fully at the onset of instruction. Different types of analysis can be conducted for descriptive statistics. For this study, aggregate change in categories was calculated. We report the change in the higher two categories in this paper.

3.4. Research Assurances

The study was approved for human subjects by Iowa State University. Validity measures for both the pre-/posttest and the end-of-session online survey were assessed by members of the Engagement Sub-committee of the STRIPS team and by members of a Program of Study thesis committee.

4. Results

4.1. Online Survey

From the total attendee population of 48, we received 41 responses for an aggregate response rate of 85%. Gender division was 26 (54%) male and 22 (46%) female. Farm advisors originated from four states: Iowa (67%), Wisconsin (27%), Nebraska (4%), and Illinois (2%). Occupational titles of registrants were organized into eight advisor categories (Figure 2). Other personal information or demographic information was not requested.

4.2. Pre-Posttest

The pre- and post-test involved correctly matching a photo (eight total) to the correct season and age of growth (year). With eight as the perfect score, the average pre-test score (Figure 3) was 6.2 and the average post-test score was 6.4 indicating that participants average scores showed a very slight rise in the average following the posttest. However, the scores ranged more widely on average in the post-test (3.1–7.4) than the pre-test (4.7–6.8), with the observation that some scores likely fell from the pretest to the post-test.

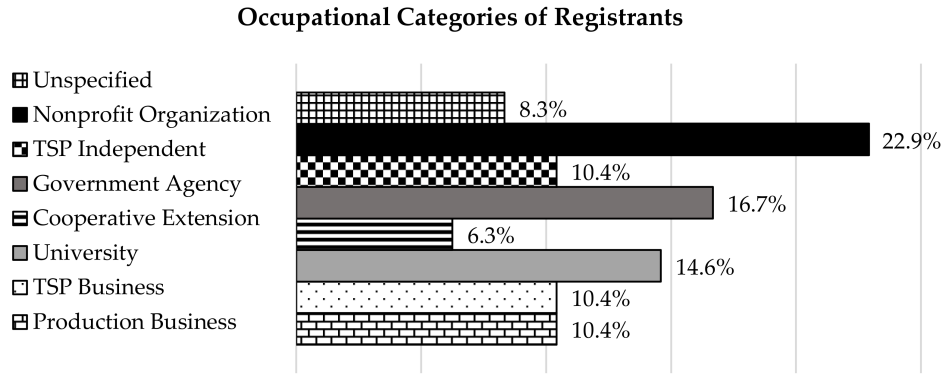

Figure 2. Occupational categories of registrants (n = 48). TSP = Technical Service Provider.

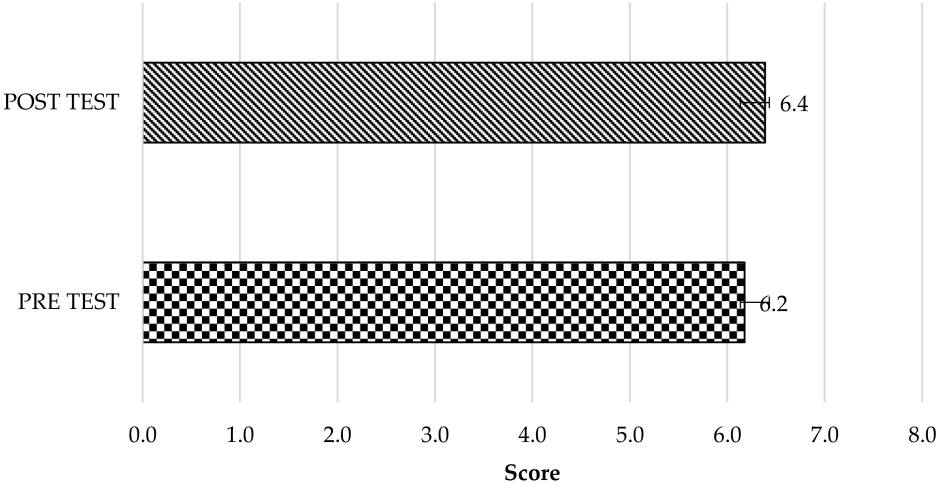

Figure 3. Pre- and post-test average score (n = 48).

4.3. Retrospective Self-Report

One question focused on ability to site or plan prairie strips on crop land for farmers and landowners in Figure 4. The other focused on the ability to assess the age of a prairie strips planting in the early years of establishment (Figure 4). Both yielded self-reports of growth in skills and confidence. The reader should note a change in population size in the following two figures from n = 48 to n = 39. Retrospective questions were asked in the post workshop survey which was sent on a voluntary basis. It is common in this type of evaluative survey work to not receive a 100% response rate, thus yielding a lower population (Figure 5).

Sixty-four percent of participants reported that at the beginning of the workshop they were "somewhat sure" or "sure" in their ability to assess the age of a planting. The combination of somewhat sure and sure increased by 21% to 87% using the retrospective format. Evaluating an age of a prairie strip requires some species identification, as well as some species composition or mix.

Additionally, 96% of respondents stated they understood the consultant role and 86% reported that they had sufficient tools to provide technical assistance as well as to communicate research benefits of prairie strips to farmers and landowners. The survey asked about the effectiveness of prairie identification and artifacts in the curriculum as shown in Table 2 to assess their satisfaction with instruction. Seventy-two percent of respondents indicated they experienced improvement in their ability to distinguish between prairie species and weed species. Seventy-two percent indicated that the prairie photos (i.e., provided during the pre-/post-test, debriefing, and as slides) played a strong role in aiding ability to identify age of a planting.

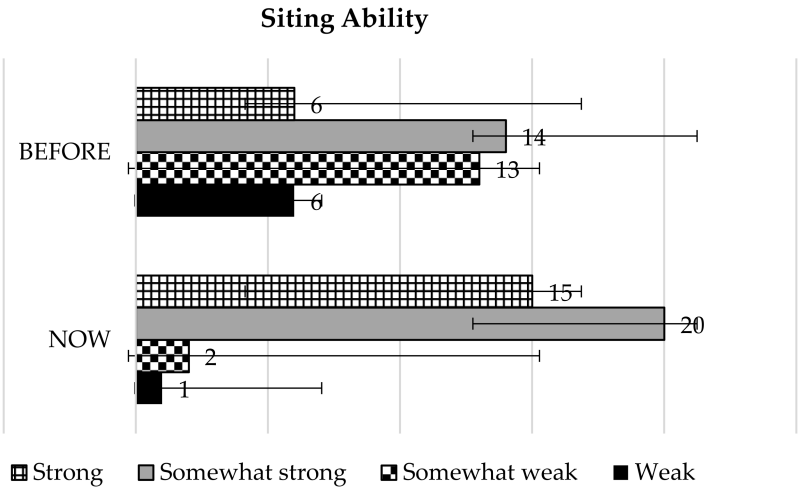

Figure 4. Retrospective self-report on ability to site and design a prairie strip on farmland (n = 39). Legend indicates Likert-style response scale.

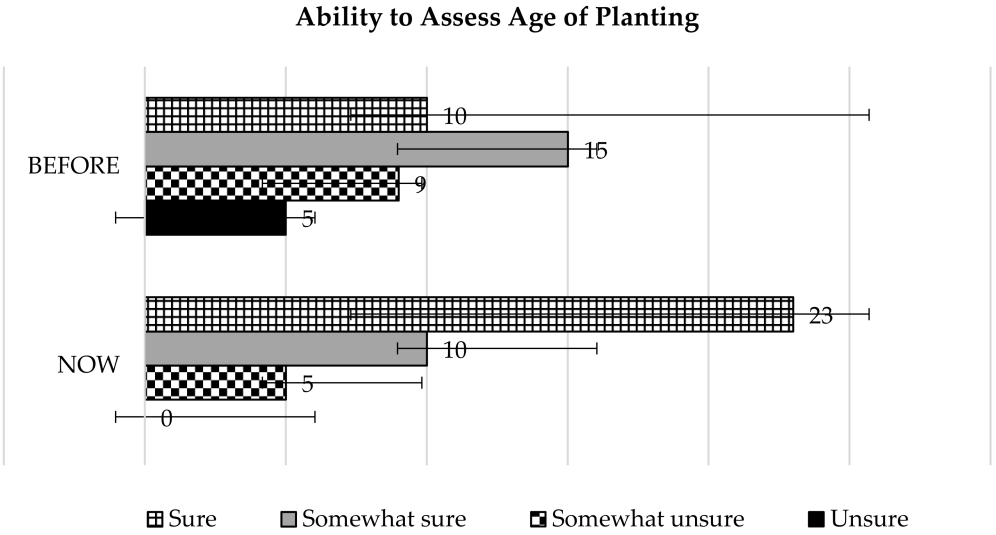

Figure 5. Retrospective self-report on ability to assess age of a prairie strips planting (N = 39). Legend indicates Likert-style response scale. This is the confidence or self-efficacy-oriented scale.

Table 2. Prairie plant identification effectiveness.

Artifact	% of Respondents that Found Helpful [1]
Photos of prairie plants and weedy look-a-likes	77
Availability of fresh plant samples	74
Availability of identification guidebooks	79

[1] Multiple responses permitted.

For overall workshop satisfaction, 81% of participants indicated the workshop was highly valuable, and 93% would recommend to other advisors. We asked respondents to report on the performance of individual topics. Eighty-three percent said they would recommend precision technology applications as a tool for consulting on prairie strips design. About 50% reported the economics area of the workshop addressed program eligibility for prairie strips adequately and 41% said program eligibility was only somewhat addressed. Sixty-one percent said the workshop conveyed the importance of high-quality prairie seed adequately. Thirty percent said this impact was conveyed well. Respondents reported which beneficial impacts of the practice were convincingly addressed (Table 3).

Table 3. Prairie strips impacts on ecosystem services addressed during workshop. Which impacts of prairie strips were convincingly addressed in the workshop?

Impact	Count [1]	%
Prairie plants have deep roots that hold soil and nutrients in place	36	90.0
Potentially improve beneficial insect and wildlife populations	35	87.5
Prairie plants have stiff upright stems that stay in a pounding rain	33	82.5
Prairie strips are effective when added at just the 10% level	32	80.0
Phosphorous is reduced by 90%	30	75.0
Cheaper than terraces.	28	70.0
N is reduced by 84% (70% for subsurface No30N)	27	67.5
There is a 44% reduction in water run-off	26	65.0
Do not reduce per acre yields	25	62.5
Do not create a weed problem	23	57.5
Costs are comparable to cover crops	22	55.0

[1] Multiple responses permitted.

Sixty-three percent of respondents reported that the farmers they worked with were influential with respect to helping others to adopt conservation practices. Regarding broader adoption of prairie strips, 95% of participants viewed prairie strips as compatible with other conservation best management practices, and 93% expressed that the practice was ready to be broadly communicated. Of respondents, 84% believed prairie strips will be a commonly applied BMP within 25 years; yet half thought that in the near term, only a small number of farmers would adopt prairie strips. Forty-six percent indicated that more research was needed before broad scale adoption. Participants were asked to select areas in which they felt additional practice or support would benefit their consulting efforts on prairie strips (Table 4).

Table 4. End-of-session check-all-that-apply items. With which topics would benefit from additional practice or support?

Topic Area	Count [1]	%
Economics/cost assessment of prairie strips	29	78
Farm assessment and siting of prairie strips	25	68
How to price consultant services	19	51
Communication with farmers and landowners	18	49
Research based impacts of prairie strips	16	43
Management of prairie strips in years 1–3	16	43
Weed versus prairie species identification	12	32
Prairie plant identification/ecology	11	30

[1] Multiple responses permitted.

Sixty-six percent said they knew three or more people who could offer support at some phase of prairie strips consulting. Thirty percent indicated they only knew one or two individuals who could offer support (Table 5).

Table 5. Additional supports listed as check-all-apply question regarding from the prairie strips team. What support/resources from the prairie strips team would be valuable to you as you proceed through the certification process?

Topic	Count [1]	%
Guidance with the communications piece [2]	24	65
Notification of other prairie strips education events	24	65
Maintenance Reminders	20	54
Prairie/Weed Identification practice	17	46

[1] Multiple responses permitted. [2] A communications piece was the product of part 2 of the Consultant program.

5. Discussion

5.1. Findings and Comparative Evaluations

Most measures and findings produced high to very high ratings and were received as a similar array to professional development scores for agricultural technology programs in the past. The scores that were moderately lower also made sense. Economics was lower, which we understood and agreed with because evidence-based information was not available on finances of prairie strips yet due to a research lag on this perennial crop, and there were not enough cooperating farmer operations producing data yet. Additionally, this time period was before the Farm Bill authorization (and before we knew there would be authorization) when funding would be made available for subsidies, which is a large part of adoption of conservation technologies.

The findings also produced a sharp differential in scores between the affective confidence in readiness of farm advisors to consult with farmers and landowners compared to their low or unchanged scores on multiple objective measures related to new and novel prairie biology, layout, growth over time, and other key elements related to management of prairie strips in crops. We explore two explanations for this atypical result: (a) satisficing [42], and (b) perceived self-efficacy [32,33]. There are likely additional plausible frameworks, but these fit an exploratory developmental evaluation discussion. Satisficing is the rating of one's own behavior or someone else's as better than warranted out of fear or wanting to please or to reduce conflict, effort or workload, or a sense of balance that is different than the program's. Some degree of satisficing is common [42]. In the Consultant program, participants may have rated their confidence higher than they would typically because they wanted to please the presenters or program staff, or felt guilty about the low prairie performance. However, usually satisficing occurs throughout a survey, and participants provided some lower scores as well as higher scores in other areas, so the conclusion on this is unknown.

We should also consider a self-efficacy argument beyond the measure of individual goal setting and individual confidence. If a person feels like they could perform in a particular place, with particular knowledge and tools, confidence could be high. Many had consulting businesses or positions already, and partners or future conferences upcoming to boost their abilities. The "total package" could lead to "perceived self-efficacy" even though the day of the workshop did not leave them with specific skills sets. Moreover, the developmental evaluation aspect of the data led us, while discussing findings, to realize that many of us heard participants give each other advice that they "did not need to learn about prairie" because they could "ask someone" from their network to come by and "diagnose" the field for age or health and do that consultation for them. This networking "work around" is a bona fide practice for professionals who are tasked broadly but work in a small firm or office. Relying on a network and responding high efficacy reliance on the network fits the "collective self-efficacy" construct that is less commonly used in research and evaluation, but nonetheless salient for programs [33,34]. Collective self-efficacy would enable a farm advisor in a training situation to honestly respond about high confidence despite lower scores in the prairie pre and post-test.

Programs elsewhere have similar experiences with divergent findings similar to the Consultant program. Roundtable events across four U.S. states on the topic of sustainability and nitrogen use among farm advisors, including from industry. Findings identified a gap in leadership and networking: very few had even met. Although the satisfaction and learning from the roundtable were reported as high, only 55% stated a willingness to recommend the event to others. Usually, high rank meant high referral, but not in this case. The authors discussed the risk the farm advisors were taking, and whether they believed colleagues would also take the risk. Risk taking cuts across both self-efficacy and worldview or identity.

A master gardener training program [43] evaluation program produced high marks for all but two items for the question "did you improve in your ability to field questions?" The items were vegetables and herbaceous plants, which are key for homeowner audiences.

Studying the results, the authors reported that these items were also the most likely for volunteers to be familiar with before joining master gardeners, preventing participants from reporting a high level of change. The "low report" is most likely an artifact of the evaluation method.

More closely matched with the Consultant program's discrepancy is a study on a professional development on pest management targeted toward pesticide reduction by staff of 892 childcare centers. Measures were provided for "confidence" in the form of 24 items on a survey [44]. Confidence was reported at high levels. However, staff also reported utilizing "traditional pesticide application practice . . . despite growing consensus on the vulnerability of young children." (p. 6240). "Traditional practices" were considered harmful and were warned against in the training program. Their discussion focused on the possibility of or need for mandated practices and on the need for an increased frequency of training due to high staff turnover. In this case, staff may have rated their confidence high for satisficing reasons or from lower comprehension of pest management tools and principles

Future changes in programming or evaluation processes may create conditions where participants learn more about prairie, or where program planners utilize evaluation tools that provide more information about ratings and reduce potential for satisficing.

5.2. Program Planning and Evaluation

Program planning changes in the arena of the Daffron and Caffarella [29] model could include several changes. For instruction, the program could occur over a longer period of time. This would allow for better spacing and retrieval, therefore greater recall and retention, then permitted by single day event. However, at the time of the Consultant program, participants were unlikely to spend multiple days, but may have higher motivation (e.g., more potential clients who may receive subsidies) or institutional support for more extensive programming at this point in the adoption cycle.

A field portion, such as a field half-day, would permit a different type of program element, transfer of training, or learning [29]. Transfer of learning events encourage participants to see an end goal in action, such as on a job site, therefore increasing the motivation to engage in learning that contributes toward the application stage. If motivation to learn was lacking, a field day event may increase the sense of responsibility to learn. Moreover, farm advisors are usually accustomed to field days and not adverse to weather and field conditions, and the event is likely to be rewarding. However, farm advisors attend many field days and have not learned the requisite knowledge related to prairie, and prairie has been available to them for a decade (e.g., CRP), so the learning that is necessary may not be sufficient.

Evaluation methods can be altered to improve data quality and findings. Self-efficacy methods were partial in this study and could be readily increased to include items of three to five. Greater numbers of items usually take up too much time for evaluations in program settings [40]. Moderate numbers of items can reveal enough about aspects of self-efficacy. Inquiry can take many forms, not just from a quantitative survey, from interviews during and post program, to video or oral entries online to opportunities for online forms. Satisficing can be identified in this way, as people are not usually hiding this aspect of their behavior because they believe strongly in its logic. There are other theoretical frameworks that may also apply, such as Theory of Planned Behavior and Motivation Theory, with a ranking of importance of items that may also assist the adoption and adaptation of prairie strips to move forward.

6. Conclusions

The Become a Prairie Strips Consultant Program featured a new and novel conservation technology for row crop agriculture and included challenging aspects for learning by farm advisors. The article dwelled on atypical results of the developmental evaluation of the first generation of professional development. Reasons for atypical results, which

included high confidence of farm advisors but low and unchanged scores in prairie elements of prairie strips biology and management, could have included satisficing, perceived self-efficacy, or a combination of the two. It was important for the team to continue to examine curriculum and instruction, although the sessions' prairie teaching resources were scored high to very high. Since the time of the workshops, promising teaching resources have been developed among the STRIPS partnerships for two of the challenging areas. New economics materials have been released [45,46]. Needs assessments [47] show awareness that farmland is being taken out of production [48]. This key area is assisted by the development of policy on the national and state levels. Novel educational programs have experimented with prairie idenfication modules. A STRIPS partner, University of Northern Iowa Tallgrass Prairie Center, opened courses with a Facebook supplement to enlarge access to prairie identification and welcomed over 750 participants [49] and included farm advisors. In another direction, the study of farm advisors in China also reminds us that offering more difficult, such as ecosystem focused, education rather than identification-focused training might be more worthwhile in the end to both farm advisors and clients. Atypical or negative findings are a means for moving forward in creative ways, built on better avenues for knowing participants and the resources that serve them. Like other types of science, evaluations that anticipate uniformly positive findings often steer away from publishing negative or contradictory findings. This habit fails to enrich the academic and program planning community and leads teams away from thinking more deeply about opportunities, especially when considering new and novel technologies such as prairie strips.

Author Contributions: Conceptualization, N.G.-S. and R.W.; methodology, R.W. and N.G.-S.; software, R.W.; validation, R.W.; formal analysis, R.W. and N.G.-S.; investigation, R.W.; resources, L.A.S.; data curation, N.G.-S. and R.W.; writing—original draft preparation, R.W.; writing—review and editing, N.G.-S., R.W. and L.A.S.; visualization, R.W.; supervision, N.G.-S. and L.A.S.; project administration, L.A.S.; funding acquisition, L.A.S. and N.G.-S. All authors have read and agreed to the published version of the manuscript.

Funding: Outreach discussed was funded by The McKnight Foundation, including a graduate research assistantship; and Iowa Agricultural and Home Economics Experiment Station, Ames, IA, USA Project No. IOW005511.

Institutional Review Board Statement: Approved Iowa State University Office of Research Assurances #16-594.

Informed Consent Statement: Not available.

Data Availability Statement: Not available.

Acknowledgments: We graciously acknowledge R. Martin, professor emeritus and mentor, Department of Agricultural Education and Studies, Iowa State University, who contributed to an earlier version of this paper but who passed away before this version had commenced. T. Youngquist assisted with technical aspects about prairie strips. Data from the evaluation are also contained, but not published, in a thesis by Whitehair [50]. We are grateful for the careful readings of the manuscript by two anonymous reviewers who helped us to improve the paper.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Jones, C.S.; Schilling, K.E.; Simpson, I.M.; Wolter, C.F. Iowa stream nitrate, discharge and precipitation: 30-year perspective. *Environ. Mgmt* **2018**, *62*, 709–720. [CrossRef] [PubMed]
2. Schulte, L.A.; Niemi, J.; Helmers, M.J.; Liebman, M.; Arbuckle, J.G.; James, G.E.; James, D.E.; Kolka, R.K.; O'Neal, M.E.; Tyndall, J.C.; et al. Prairie strips improve biodiversity and the delivery of multiple ecosystem services from corn–soybean croplands. *PNAS* **2017**, *114*, 11247–11252. [CrossRef] [PubMed]
3. Potts, S.G.; Biesmeijer, J.C.; Kremen, C.; Neumann, P.; Schweiger, O.; Kunin, W.E. Global pollinator declines: Trends, impacts and drivers. *Trends Ecol. Evol.* **2010**, *25*, 345–353. [CrossRef] [PubMed]
4. Rosenberg, K.V.; Dokter, A.M.; Blancher, P.J.; Sauer, J.R.; Smith, A.C.; Smith, P.A.; Stanton, J.C.; Panjabi, A.; Helft, L.; Parr, M.; et al. Decline of the North American avifauna. *Science* **2019**, *366*, 120–124. [CrossRef]

5. Obrycki, J.F.; Karlan, D.L. Optimizing Iowa land use: Past perspectives for current questions. *J. Soil Water Conserv.* **2018**, *73*, 693–704. [CrossRef]
6. Iowa Department of Agriculture and Land Stewardship (IDALS); Iowa Department of Natural Resources (IDNR); Iowa State University, College of Agriculture and Life Sciences (ISU CALS). Updated ed; Iowa Nutrient Reduction Strategy: A Science and Technology-Based Framework to Assess and Reduce Nutrients to Iowa Waters and the Gulf of Mexico 2017. Available online: http://www.nutrientstrategy.iastate.edu/sites/default/files/documents/2017%20INRS%20Complete_Revised%202017_12_11.pdf (accessed on 15 December 2017).
7. Prokopy, L.S.; Floress, K.; Arbuckle, J.G.; Church, S.P.; Eanes, F.R.; Gao, Y.; Gramig, B.M.; Ranjan, P.; Singh, A.S. Adoption of agricultural conservation practices in the United States: Evidence from 35 years of quantitative literature. *J. Soil Water Conserv.* **2019**, *74*, 520–534. [CrossRef]
8. Franz, N.K.; Townson, L. The nature of complex organizations: The case of cooperative extension. *New Direct. Eval.* **2008**, *120*, 5–14. [CrossRef]
9. Engler, A.P.; Poortvliet, M.; Klerkx, L. Toward understanding conservation behavior in agriculture as a dynamic and mutually responsive process between individuals and the social system. *J. Soil Water Cons.* **2019**, *74*, 74A–80A. [CrossRef]
10. Lu, J.; Ranjan, P.; Floress, K.; Arbuckle, J.G.; Church, S.P.; Eanes, F.R.; Gao, Y.; Gramig, B.M.; Singh, A.S.; Prokopy, L.S. A meta-analysis of agricultural conservation intentions, behaviors, and practices: Insights from 35 years of quantitative literature in the United States. *J. Environ. Mgmt.* **2022**, *323*, 116240. [CrossRef]
11. Nettle, R.; Crawford; Brightling, P. How private-sector farm advisors change their practices: An Australian case study. *J. Rural Stud.* **2018**, *58*, 20–27. [CrossRef]
12. Eanes, F.R.; Singh, A.S.; Bulla, B.R.; Ranjan, P.; Fales, M.; Wickerham, B.; Patrick, J.; Doran, P.J.; Prokopy, L.S. Crop advisers as conservation intermediaries: Perceptions and policy implications for relying on nontraditional partners to increase U.S. farmers' adoption of soil and water conservation practices. *Land Use Policy* **2019**, *81*, 360–370. [CrossRef]
13. USDA Natural Resources Conservation Service. *Planning and Applying Prairie Strips*; Agronomy Technical Note No. 21; USDA National Resources Conservation Services: Washington, DC, USA, 2021.
14. Iowa State University. Science-Based Trials of Rowcrops Integrated with Prairie Strips. 2022. Available online: https://www.nrem.iastate.edu/research/STRIPS/ (accessed on 1 October 2022).
15. Helmers, M.J.; Zhou, X.; Asbjornsen, H.; Kolka, R.; Tomer, M.D.; Cruse, R.M. Sediment removal by prairie filter strips in row-cropped ephemeral watersheds. *J. Environ. Quality.* **2012**, *41*, 1531–1539. [CrossRef] [PubMed]
16. Zhou, X.; Helmers, M.J.; Asbjornsen, H.; Kolka, R.; Tomer, M.D.; Cruse, R.M. Nutrient removal by prairie filter strips in agricultural landscapes. *J. Soil Water Conserv.* **2014**, *69*, 54–64. [CrossRef]
17. Craig, A.J.; Rehmann, C.R.; Alt, L.M.; Schulte, L.A.; Soupir, M.L. Prairie strips reduce fecal indicator bacteria concentrations in simulated runoff. *J. Amer. Water Res. Assn.* **2022**. [CrossRef]
18. Schulte, L.A.; MacDonald, A.L.; Niemi, J.B.; Helmers, M.J. Prairie strips as a mechanism to promote land sharing by birds in industrial agricultural landscapes. *Agric. Ecosys. Environ.* **2016**, *220*, 55–63. [CrossRef]
19. Kordbacheh, F.; Liebman, M.; Harris, M. Strips of prairie vegetation placed within row crops can sustain native bee communities. *PLoS ONE* **2020**, *15*, e0240354. [CrossRef]
20. Meissen, J.C.; Glidden, A.J.; Mark, E.; Sherrard, M.E.; Elgersma, K.J.; Jackson, L.L. Seed mix design and first year management influence multifunctionality and cost-effectiveness in prairie reconstruction. *Restor. Ecol.* **2020**, *28*, 807–816. [CrossRef]
21. Glidden, A.J.; Sherrard, M.E.; Meissen, J.C.; Myers, M.C.; Elgersma, K.J.; Jackson, L.L. Planting time, first-year mowing, and seed mix design influence ecological outcomes in agroecosystem revegetation projects. *Restor. Ecol.* **2022**, 13818. [CrossRef]
22. Rogers, E.M. *Diffusion of Innovations*, 5th ed.; Free Press of Glencoe: New York, NY, USA, 2003.
23. Klerkx, L.; Jansen, J. Building knowledge systems for sustainable agriculture: Supporting private advisors to adequately address sustainable farm management in regular service contacts. *Intl. J. Agric. Sust.* **2010**, *8*, 148–163. [CrossRef]
24. Leeuwis, C.; Aarts, N. Rethinking communication in innovation processes: Creating space for change in complex systems. *J. Agric. Educ. Exten.* **2011**, *17*, 21–36. [CrossRef]
25. Arbuckle, J.G., Jr. *2014 Summary report: Iowa Farm and Rural Life Poll*; PM 3075; Iowa State University Extension and Outreach: Ames, IA, USA, 2015.
26. Dockès, A.; Chauvat, S.; Correa, S.; Turlot, A.; Nettle, R. Advice and advisory roles about work on farms: A review. *Agron. Sus. Devel.* **2019**, *39*, 2. [CrossRef]
27. Morris, C.; Arbuckle, J.G.; DeLong, C.; Lindahl, C. *Conservation Practitioner Poll 2021*; Summary Report; Soil and Water Conservation Society: Ankeny, IA, USA, 2021; Available online: https://www.swcs.org/static/media/cms/Conservation_Practitioner_Poll_2021_58F72FBA81040.pdf (accessed on 15 October 2021).
28. Patton, M.Q. Developmental evaluation. *J. Eval. Pract.* **1994**, *15*, 311–319. [CrossRef]
29. Daffron, S.R.; Caffarella, R.S. *Planning Programs for Adult Learners: A Practical Guide*, 4th ed.; Sage Publications: Thousand Oaks, CA, USA, 2021.
30. Anderson, L.W.; Krathwohl, D.R. *A Taxonomy for Learning, Teaching, and Assessing: A revision of Bloom's Taxonomy of Educational Objectives*; Longman: New York, NY, USA, 2001.
31. Mangan, J.; Mangan, M.S. A comparison of two IPM training strategies in China: The importance of concepts of the rice ecosystem for sustainable insect pest management. *Agric. Hum. Values* **1998**, *15*, 209–221. [CrossRef]

32. Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psych. Rev.* **1977**, *84*, 191–215. [CrossRef]
33. Bandura, A. Exercise of human agency through collective efficacy. *Curr. Dir. Psych. Sci.* **2000**, *9*, 75–78. [CrossRef]
34. Goddard, R.D.; Hoy, W.K.; Woolfolk Hoy, A. Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. *Educ. Res.* **2004**, *33*, 3–13. Available online: https://www.jstor.org/stable/3700071 (accessed on 1 June 2022). [CrossRef]
35. Drape, T.A.; Lopez, M.; Radford, D. Teacher efficacy and professional development needs of mid-career agriculture educators integrating the Next Generation Science Standards and other content areas. *Career Tech Educ. Res.* **2016**, *41*, 33. [CrossRef]
36. Lam, C.Y.; Shulha, L.M. Insights on using developmental evaluation for innovating: A case study on the cocreation of an innovative program. *Amer. J. Eval.* **2015**, *36*, 58–374. [CrossRef]
37. Honadle, B.W.; Zapata, M.A.; Auffrey, C.; vom Hofe, R.; Johanna Looye, J. Developmental evaluation and the 'Stronger Economies Together' initiative in the United States. *Eval. Program Plan.* **2014**, *43*, 64–72. [CrossRef]
38. Mitchell, A. *Second-Order Learning in Developmental Evaluation: New Methods for Complex Conditions Evaluation*; Springer Nature Switzerland Palgrave MacMillan: Berlin/Heidelberg, Germany, 2019. [CrossRef]
39. Carberry, P.S.; Hochman, Z.; McCown, R.L.; Dalgliesh, N.P.; Foale, M.A.; Poulton, P.L.; Hargreaves, J.N.G.; Hargreaves, D.M.G.S.; Cawthray, S.; Hillcoat, N.M.J.; et al. The FARMSCAPE approach to decision support: Farmers', advisers', researchers' monitoring, simulation, communication and performance evaluation. *Agric. Syst.* **2002**, *74*, 141–177. [CrossRef]
40. Robinson, S.B.; Leonard, K.F. *Designing Quality Survey Questions*; Sage Publications: Thousand Oaks, CA, USA, 2019.
41. Lam, T.C.M.; Bengo, P. A comparison of three retrospective self-reporting methods of measuring change in instructional practice. *Amer. J. Eval.* **2003**, *24*, 65–80. [CrossRef]
42. Artinger, F.M.; Gigerenzer, G.; Jacobs, P. Satisficing: Integrating two traditions. *J. Econ. Lit.* **2022**, *60*, 598–635. [CrossRef]
43. Swackhamer, E.; Kiernan, N.E. A multipurpose evaluation strategy for master gardener training programs. *J. Extension.* **2005**, *45*, 5. Available online: https://tigerprints.clemson.edu/joe/vol43/iss6/5 (accessed on 5 May 2021).
44. Mir, D.F.; Finkelstein, Y.; Tulipano, G.D. Impact of integrated pest management (IPM) training on reducing pesticide exposure in Illinois childcare centers. *NeuroTox* **2010**, *31*, 621–626. [CrossRef] [PubMed]
45. Khanal, B.; Schoengold, K.; Mieno, T.; Schulte Moore, L. Impact of policy design on willingness to pay for ecosystem services from prairie strips. *J. Agric. Appl. Econ.* **2022**, *1*, 352–369. [CrossRef]
46. Brandes, E.; McNunn, G.S.; Schulte, L.A.; Bonner, I.J.; Muth, D.J.; Babcock, B.A.; Sharma, E.A.; Heaton, E. Subfield profitability analysis reveals an economic case for cropland diversification. *Environ. Res. Lett.* **2016**, *11*, 14009. [CrossRef]
47. Whitehair, R.; Grudens-Schuck, N. *Prairie Strips Consultant Educational Needs Assessment: 2017 Survey*; Technical Report; Iowa State University, Department of Agricultural Education and Studies: Ames, IA, USA, 2017; Available online: https://www.nrem.iastate.edu/research/STRIPS/files/publication/prairiestripswsdevneedsassessjune2017_rev5_2_18.pdf (accessed on 5 May 2021).
48. Agholor, A.; Issac, S. A review of extension self-efficacy: Bases, features, goal realisation, and implications for extension. *S. Afr. J. Ag. Ext.* **2019**, *47*, 140–149. [CrossRef]
49. Tallgrass Prairie Center. *Tallgrass Prairie Center 2020-2021 Highlights*; University of Northern Iowa, Tallgrass Prairie Center: Cedar Fall, IA, USA, 2021; Available online: https://tallgrassprairiecenter.org/sites/default/files/tallgrass_prairie_center_highlights_2021.pdf (accessed on 5 March 2022).
50. Whitehair, R. *Agricultural Conservation Adoption in the US Midwest: Needs Assessment and Evaluation of Professional Development for Farm Advisers*; Master of Science; Iowa State University: Ames, IA, USA, 2019; Available online: https://dr.lib.iastate.edu/handle/20.500.12876/31790 (accessed on 16 March 2020).