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Communicating with Data: Telling the Extension Story in Credible and Actionable Ways

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Effective communication requires a good message delivered through an effective channel and received by a receptive individual. When that communication is successful, the result is enhanced credibility and trust between the sender and the receiver. Telling the Extension story effectively requires both relevant, credible data to compose a clear message and appropriate communication channels to deliver the message to various audiences. This article describes the approach taken by Florida Extension to gather better statewide data to improve communication about the impact of its Extension work, primarily through the use of infographics. With credible data, and working together, Extension data analysts and communicators can enhance Extension's reputation, trust, and support with key stakeholders.

Keywords: communication, trust, data visualization, infographics, statewide indicators, impacts, data quality

"Evidence is evidence, whether words, numbers, images, diagrams, still or moving. It is all information after all. For readers and viewers, the intellectual task remains constant regardless of the particular mode of evidence: to understand and to reason about the materials at hand, and to appraise their quality, relevance, and integrity."

—Edward R. Tufte (2006, p. 83)

Introduction

As discussed in the other articles in this special edition of the Journal of Human Sciences and Extension, much thought and work are required to collect credible and actionable evidence in Extension. With high quality, positive data in hand, it is essential that Extension effectively communicate the value of that effort. What good is credible evidence if not shared and utilized? In this article, we expand the concept of credibility beyond valid evaluation practices, measurement, and context and emphasize the credibility of the message and messenger as equally important when telling the Extension story.

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What happens when data quality is weak or unknown? Often, we still need to tell a story to show there is progress being made on a priority issue or to simply stay relevant. This article describes the University of Florida Institute of Food and Agricultural Science's (UF/IFAS) struggles to obtain credible evidence at a statewide level, its efforts to expand the use and usefulness of available data, and how the organization leverages resources on campus and beyond to tell the Extension story and credibly demonstrate the value of its work. We are highlighting the UF/IFAS experience not as a model approach, but as one path of many toward demonstrating the impact of Extension's efforts.

The UF/IFAS initiative to gather better statewide data, and the increased use of existing evaluation data more generally in Extension communications, has served to increase attention on program outcomes and the quality of its evaluation tools and methodologies. The initiative represents a continuous, non-linear process to make evaluation processes and products more relevant, useful, and adaptable for Extension staff and stakeholders.

Throughout this article we use the term *impact* to broadly describe the demonstrated success of an Extension program or group of programs and do not strictly adhere to the United States Department of Agriculture National Institute of Food and Agriculture (USDA-NIFA) definition of *condition outcomes* as outlined in their Generic Logic Model for NIFA Reporting guidelines (USDA-NIFA, 2015). We believe behavior change data, which is emphasized in our statewide indicators initiative, allows us to make judgments not only about program participants but also about the implications of that collective behavior change to the larger society.

There are many ways to communicate the success of Extension programs or research projects. Our focus here will be on printable, one-page infographics for showing impact because our lobbyists and Extension administrators tell us they are effective when interacting with stakeholders. While Extension data are often shared with the general public through social media and the internet, UF/IFAS has little evidence to suggest its effectiveness in communicating the value of Extension or even raising awareness of Extension. Empirical and marketing research (Evergreen, 2018b; Lankow, Ritchie, & Crooks, 2012; McCue, 2013; Tufte, 2006) indicates that portraying information visually is effective. For this reason, we strongly support the broad use of infographics for telling the Extension story.

Communication that Supports Credibility and Trust

Trust can be an elusive concept and one that is influenced by how an organization presents itself to its stakeholders, including local, state and federal lawmakers; donors and funding agencies; local supporters; partners and organizations; media and digital influencers; clients; and the organization's own faculty and staff. Jiang (2016) contends that two important elements lead to trust between an individual and an organization: *relationships* and *transparency*. People trust their families, friends, and co-workers (relationships) after they have multiple experiences that confirm a level of trust. Transparency involves more analytical thinking involving the individual

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being able to see and process information for him- or herself. When combined with the reality that most communication is now conveyed on a digital platform dependent on visuals and that most individuals will find this information by searching online, communicators must ask, "What visuals will increase credibility and nurture trustworthiness in the organization?"

Jiang (2016) tested five design approaches most often used on websites: 1) text and supporting small images, 2) larger photos with minimal text, 3) small infographics to explain operations, 4) text with interactive infographics, and 5) text presented in a flow chart. While there was no one comprehensive finding that one of these methods was more effective than the others, Jiang's (2016) research indicated that the effectiveness of the communication method (e.g., photo, graphic, infographic, story) depended on the audience for which it was intended. Users preferred text, infographics, and flow chart displays when used for websites, but preferred photo narratives for social media and email. Stakeholders expected to learn different information from different communication channels (i.e., different information was expected from websites than social media). The overall finding for all communication methods was that visuals were very effective in communicating messages regardless of the channel. A significant recommendation for all Extension professionals (i.e., county Extension agents or educators and state faculty with an Extension appointment) would be to think visually and include visuals often in any communication channel.

So, how is a communicator to choose the best method of distributing credible and actionable information to diverse stakeholders? One approach would be to create a visual design of the critical data (e.g., using infographics, photos, charts, drawings) and distribute this information through multiple channels (e.g., website, blog, social media). Communicators could also conduct periodic focus groups with key audiences to assess which methods were most effective. Digital applications can now also provide data, such as the number of views, time on the page, shares, likes, and comments, that can also provide feedback on the effectiveness of different communication methods and channels. These types of information may be used to refine the organization's communications strategy, thereby increasing the sender's effectiveness, which leads to the increased potential of the message being received and the information receiver being more receptive to the sender's credibility.

Specific communications tactics such as logos, website designs, and an organization's digital presence can also influence an organization's credibility (Lowry, Wilson, & Haig, 2014). For example, logos are considered an important part of an organization's identity or reputation. State Extension programs are divisions of the United States' land-grant universities. The land-grant universities are most likely better recognized and more respected than the actual Extension programs. Combined with the reality that users often make decisions about an organization within the first few seconds of viewing a website or social media post, it would be beneficial for Extension programs to prominently display and connect to their parent land-grant university through use of the university's logo.

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As an example, UF/IFAS went through a branding redesign to enhance its logo to strengthen an intentional connection between the University of Florida and that university's land-grant mission. Branding guidelines instructed Extension professionals, state faculty and staff how and when to use the logo, including emphasizing the use of "UF/IFAS Extension" verbally and in print instead of simply using "Extension" or "IFAS Extension" as they had in the past.

The effectiveness of changes like this should be evaluated over years, not months. At UF/IFAS, our results have been mixed. More Extension county offices and Extension staff are properly referring to the organization according to the new guidelines, yet the institutional application of brand standards has been inconsistent. The only absolute is that attention to and education about branding standards is a constant activity and one that is never completed.

The Role of Communication Methods in Establishing Credibility

Establishing a reputation as a credible source of information is essential to an Extension program's ability to secure the trust of its internal and external stakeholders (Cutlip, Center, & Broom, 1985). The relevancy of Extension hinges on these stakeholders' perceptions that the organization is responding to critical community needs through efficient and effective programming. Understanding how these important audiences best receive information and how they assess it as trusted information is fundamental to effectively advancing Extension's mission.

To be effective, all communication, whether verbal, written, or visual, should have some fundamental elements. These include identification of the target audience(s), development of a concise and clear message, choice of the most desirable "channel" to convey the message, a credible source to deliver the message, an opportunity to be repeated multiple times, consistency of message when delivered, and the capability of the audience to receive the message (Cutlip et al., 1985).

As Extension programs serve multiple and diverse audiences, it is not likely that a single message using a singular method for all audiences will realize a program's communication goals. Therefore, a single message may be altered to be delivered by a variety of "senders" via different "channels" at different times.

Choosing the most effective spokesperson (source or sender), the best channel, clear message, and best communication tactic can be challenging (Table1). Qualitative and quantitative research methods may be used to identify which communication tools to use. Focus groups with stakeholders, short surveys, and media content analyses are all affordable research methods that may provide valuable insights when developing a communications strategy. Then, matching the communications channel to the audience is driven by data not by personal preference (Wiles, 2017).

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Table 1. Matrix for Determining the Right Communications Channel

Channel Type	Example	Good Way To	Pros	Cons
Central communications (one to many)	• Press release • E-mail • Memo • Intranet post	• Update/inform large group about issues of "big" concern/initiative	• Scalable • Reaches multiple stakeholders	• Difficult to gauge impact • Limited opportunity to clarify
Leader presentation (one to many)	• Media interview • Press conference • Town hall • CEO video/blog	• Motivate and energize audience • Make important announcement	• Good way to address issues • Highly credible source	• One-way communication • Audience often intimidated to ask questions
Manager cascade (one to few)	• Communication in team meetings • E-mail	• Inform/update on team specific and/or sensitive matters	• Trusted source • Personal	• Messages often fail to get through • Manager not familiar/bought-in
Manager dialogue (interactive)	• Group discussion • Manager one-on-one	• Problem solve/gain feedback • Translate strategy into action	• Helps resolve issues • Drives behavioral change	• Time intensive • High variability in manager communication skill
Mobile and social media updates (one to many)	• Company blog • Intranet • Twitter • SMS mobile • Company Facebook	• Time-sensitive information updates/alerts • Humanizing the company	• Ease of access to information • Tracking sentiment	• If not done properly, company can be seen as "phony"
Social media participation (interactive)	• Discussion forum • Blog • Twitter • YouTube	• Sharing viewpoints • Engaging in debates • Creating a dialog	• Builds engagement • Gives a human face to the company	• Little control over the communication • Possible rejection of corporate agenda
Enabling advocates (many to many)	• Employees • Suppliers • Customers	• Reputation management • Reaching out to skeptical audiences • Spread viral message	• Trusted sources • High resonance • High "stickiness"	• Ability to find suitable advocates • Time-sensitive

Note: Adapted from Wiles, J. (2017). *How to choose the right communications channel* [Blog post].

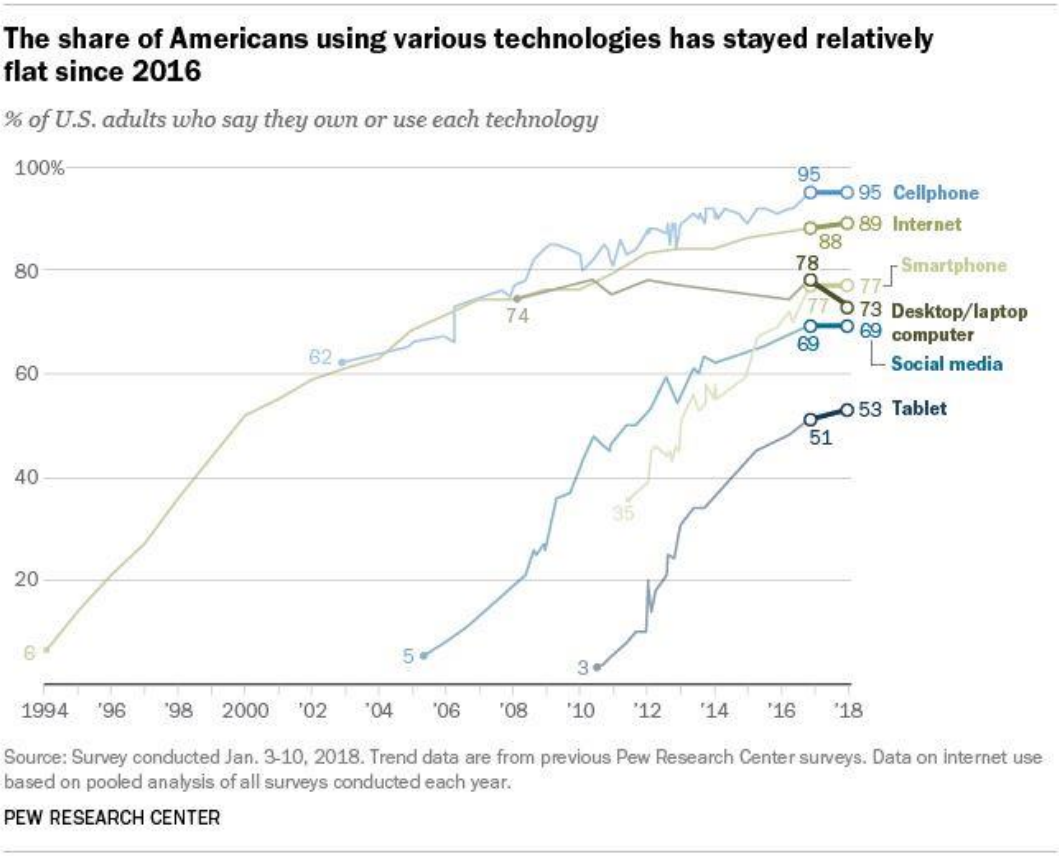
The Changing Communication Landscape

Extension programs operate in a communication zone that has 24-hour access to data and information through the digital platform. While Extension programming has traditionally relied primarily on print publications, radio, and more recently, websites, information of all and any kind is now available through blogs, Facebook, Twitter, texts, podcasts, live streams, etc. More

importantly, new audiences search for information in an increasing number of new sources on the digital platform. A survey conducted by the Pew Research Center in early 2016 found that about only one-fifth of U.S. adults *often* received news from print newspapers, down from 27 percent in 2013. That decline is also directly related to age with less than ten percent of 18-29-year old individuals getting news from newspapers, while almost half of those 65 and older choosing traditional newspapers as a primary source of information (Mitchell, Gottfried, Barthel, & Shearer, 2016). As traditional print media consolidates and declines, hundreds, if not thousands, of digital outlets publish and distribute information every minute of every day at a global level. These new information outlets provide additional opportunities for Extension programs to distribute evidence of their success.

A more recent Pew Research Center study (Hitlin, 2018) projects that 95 percent of Americans use various technologies to receive information including mobile phones, the Internet, web and social media (Figure 1). According to this Pew study, a majority of U.S. adults now receive their daily news from digital sources, such as the Internet, social media, email, and texts, and more increasingly, are receiving their information on mobile devices.

Figure 1. Graph of Americans' Use of Various Technologies



Note: From Hitlin, P. (2018). Copyright 2018 by Pew Research Center.

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According to a Pew Research Center survey (Hitlin, 2018), about two-thirds of American adults (68 percent) say they at least occasionally get news on social media. While receiving or being exposed to news is increasing online, research surveys indicate that more social interaction about the news is personal, that is, done through word of mouth with someone you know. The 2016 Pew Research Center survey (Mitchell et al., 2016) showed that 85 percent of U.S. adults who most commonly share news with others do so by word of mouth. Seventy-seven percent of U.S. adults had confidence in family, friends, and acquaintances as a trusted source on news. This is compared to 82 percent having trust in local news and 76 percent for national news (Mitchell et al., 2016).

If Extension organizations want to be perceived as credible sources in this dynamic and changing media environment, communicators of Extension information need to understand that how their stakeholders perceive an organization may be more influenced by a third party (a family member or friend) and what those parties know about the organization than by a direct exchange between the stakeholder and the organization. In addition, that perception will most likely be formed by information shared on Facebook, Twitter, and Instagram than through the traditional media of print newspapers.

Trusting the Information

After understanding where and how people receive their news, the foundational issue, again, is trust. Do decision makers, lawmakers, and other stakeholders trust the source of this information? Public trust in higher education institutions is eroding. Surveys of the general public reflect opinions held by some that higher education institutions are too expensive, too political and liberal, do not allow students to think for themselves, are not relevant, and are not well run (Association of Governing Boards, 2018). These surveys call into question Extension's ability to ensure that we are prudent stewards of public and private investment (Edelman, 2018). Extension is a key component of the missions of land-grant universities in the United States and is, therefore, tied to institutions of higher education.

Extension has long prided itself as a trusted source of unbiased information, according to a national branding research study commissioned by the Extension Committee on Organization and Policy (ECOP), conducted in 2008-2010 by Copernicus Marketing and Consulting Research (North, 2011). The study surveyed members of the general public. Being seen as a trustworthy source was the highest-ranking asset that Extension had as part of its brand value (84 percent). This was followed by a credible staff and convenient access to reliable information. In the current fast-changing environment, new trend data are needed.

The ECOP study also found that Extension needed to do a much better job communicating the value it provides to the community. While the researchers concluded that Extension does deliver on its promise to provide science-based programming of relevance to clients, an awareness of Extension, in many places, still remained low. Our own experience shows annual reviews of

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Florida county Extension programs regularly cite low awareness of programs as an area of needed improvement (Harder, Moore, Mazurkewicz, & Benge, 2013). In the ECOP national branding study, researchers found that even those who had heard about Extension do not know much about it. The study also found that younger people (18-35) were much less likely to have heard of Extension, posing critical challenges for advancing and securing the future of the organization.

Measuring the Value of Extension

Over the past three decades, funding agencies and stakeholders in general increasingly expect Extension to demonstrate the public value of its programs (Franz, 2013), in part due to increasing competition for public funds (Franz & Townson, 2008). Many large-scale research projects now require an Extension or outreach component (Harder, Lamm, & Galindo, 2018). Thus, Extension must improve evaluation capacity relative to program design (Franz & Archibald, 2018; Rennekamp & Engle, 2008). Moreover, the ECOP national branding study (North, 2011) points to a lack of awareness of Extension's contributions to the community among the general public, particularly young adults, who are Extension's future clients; legislators; and funders.

While, in many cases, it is ideal to show economic impact in terms of cost savings or increased income, due to stakeholders' emphases on return on investment, sometimes the best Extension professionals can say is that a program's outcomes are good for the larger society, and this can be quite effective as well (Franz, 2013). Data collected by land-grant universities for accountability purposes can provide this economic impact and "public value" with some effort and creativity (Franz, Arnold, & Baughman, 2014).

Each year the Extension and Agricultural Experiment Station components of land-grant universities are required to submit a report to the National Institute of Food and Agriculture (NIFA) that demonstrates the impact the universities' work funded through Smith-Lever (Extension) and Hatch (Research) federal funds. To fulfill this requirement, institutions collect data on how many Extension clientele were reached and by what means (e.g., group session, email, phone call) as well as how many clients increased knowledge or awareness, learned a new skill, adopted best practices, or changed their behavior in positive ways. Moreover, NIFA also requires several brief impact narratives that describe a research project or Extension program, its results, and the significance of those results. Beyond this federal requirement, and perhaps other required state and local accountability reports, these valuable data are not often used in ways that convey Extension's successes to stakeholders and even to its own faculty and administrators.

Historically, many land-grant institutions' Extension organizations have struggled with showing statewide impact, focusing instead on smaller projects and programs located in a single county or region within a state. However, this is not ideal for telling a comprehensive Extension story, as evidenced by several recent federal initiatives to develop national indicators. In 2011, NIFA convened a group of 60 Extension and Agricultural Experiment Station professionals from land-

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grant universities and 10 NIFA National Program Leaders with a goal of developing indicators that could be used by all states and allow NIFA to more easily provide aggregated data to USDA, the Office of Management and Budget (OMB) and Congress. This working group developed 129 indicators. The panel's final report emphasizes the states' adoption and reporting of these indicators to NIFA is voluntary (USDA, 2011), and this practice continues today.

Similar efforts to develop common measures among states have occurred more recently in other Extension program subject matter areas, such as Family and Consumer Sciences (FCS) in 2013, SNAP-Ed (the nutrition education component of the USDA's Supplemental Nutrition Assistance Program) and Community Resource and Economic Development (CRED) in 2014, and 4-H in 2015. The extent to which states are using these shared measures in conveying Extension's impact to stakeholders is unknown.

Demonstrating Statewide Impact – A State Example

At the University of Florida, Extension professionals are expected to collect evaluation data for their Extension programs. New hires also receive evaluation training and support as part of their onboarding. The primary purpose of Extension program evaluation is to assess the quality, impact, or success of trainings, activities, workshops, and programs. For the purpose of telling the Extension story, the focus is on program impact; that is, "Did the program make a positive difference in the lives of the participants or their community?" Stakeholders and funders want to know if the participants learned something that increased knowledge or awareness, if they developed new skills, if they changed behaviors, or if the program improved the social, economic, or environmental conditions of the individual participants or the communities in which they live. The struggle for UF/IFAS Extension has been how to get from demonstrating success for individual programs to showing the statewide impact of many programs focused on a critical issue. Reasons for this struggle are largely due to four factors: size, job structure, culture, and local influence. Florida Extension employs about more than 600 Extension professionals and state Extension faculty. Most hold tenure-track or permanent status positions, a process which encourages individuality. Florida has a long tradition of autonomy for Extension professionals, and streamlining evaluation represents a significant cultural shift for the organization. In addition, Extension professionals are expected to meet the needs of the counties in which they work, and programs may be adjusted to meet those needs. Florida's 67 counties provide significant funding (ranging from 20-60 percent) for Extension programs.

Encouraged by the 2011 NIFA initiative to create national indicators for priority areas, and after years of evaluation specialists working with issue-based teams of Florida Extension professionals to develop shared surveys and evaluation methods that produced limited results, in 2017 UF/IFAS Extension initiated a new approach to gather more statewide data quickly and efficiently. In six months, new statewide indicators were developed, with input from state faculty, Extension professionals, and Extension program leaders. Many of the NIFA indicators

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developed by the NIFA working group in 2011 provided the foundation for the initial UF/IFAS effort.

In designing the Florida Extension indicators, the focus was on creating broadly worded measures that could capture a range of programs with one indicator and provide flexibility to Extension professionals who use multiple methods and/or survey questions to collect evaluation data. The goal was that every Extension professional and state faculty who works with clientele should have data for at least one of the statewide indicators. Importantly, most teams were limited to 2-3 indicators, resulting in 87 statewide indicators for the first year and nearly 100 for the second year of data collection. During this process, it was easy to see how creating indicators can quickly get out of hand. The added burden of having too many statewide indicators on those reporting data as well as those managing the data is equally important.

A key consideration throughout the process of designing and selecting statewide indicators is identifying the critical elements or data needed to effectively communicate impact, and just as important, evaluating whether those data are credible. Are enough faculty using valid instruments to adequately capture the data requested? What is the level of program fidelity (i.e., are the underlying programs being evaluated, strictly implemented as designed in terms of lessons, target audience, and frequency [high fidelity] or are they widely adapted to meet local needs [low fidelity])?" (Olson, Welsh, & Perkins, 2015). Due to Florida Extension's size and decentralized nature of programming, program fidelity is difficult to assess statewide. Moreover, adapting programs to meet local needs may actually increase the data's credibility, so any statewide or large-scale review of program fidelity must be done on a case-by-case basis. Given the significant time and resources it takes to develop valid instruments and assess the degree of program fidelity underlying key indicators, UF/IFAS recognizes this work will take time and must be prioritized, focusing on key measures and evaluation results that the organization needs to communicate to stakeholders.

To limit the number of indicators displayed in the reporting system to the Extension professional and state faculty, UF/IFAS maps each indicator to one or more issue-based teams. When the Extension professional or state faculty member indicates that they work under a particular team, the reporting system displays all the indicators associated with that team. Indicators typically apply to more than one issue-based team, and sometimes more than one program area (e.g., some food safety indicators apply to both the agriculture and family and consumer science program areas). Each indicator is displayed once in the reporting system even if it is tied to several teams associated with the Extension professional or state faculty. Eighty percent of Florida's Extension professionals report under multiple teams so they may be shown several indicators if there is little overlap in those teams' indicators. The difficulty in such an approach is displaying enough indicators to adequately capture the work of the Extension professional or state faculty member while not overwhelming and frustrating them with a long list of indicators.

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Improving Data Quality for Communications

One downside to using broad statewide indicators in a reporting system is that much of the underlying evaluation data, methodology, and degree of program fidelity is unknown when looking at the overall results. To address this limitation, the statewide indicator results are shared widely with the Extension teams and administrators. The raw data, listing the individual Extension professional or state faculty member and her or his work unit, are most helpful in assessing data quality by the identification of outliers, inconsistencies, and unexpected results. As one team leader said after a review of the data for his program area, "I don't think they are interpreting the indicator as we would like." Ideally, the Extension evaluation specialist uses this information to create better evaluation training for Extension professionals or modifies the indicator wording or both.

Notably, the data quality of the statewide indicators is also weighed in the context of limited time and resources. There is great variability in data collection and quality among programs due to many factors, including external pressure or relevance, program maturity, evaluation skills and capacity of Extension professionals, and the degree of support from Extension evaluation specialists (Rennekamp & Engle, 2008). At UF/IFAS, the more mature programs, with established program theory and research-based outcomes, are more likely to be highlighted using communication devices such as infographics. In this case, the broader indicator or indicators can then be used to supplement the more specific programmatic and credible evidence and provide some statewide context. For example, a 25-year program to develop systems and best practices to help Florida's watermelon growers has credible data showing greater crop yields with corresponding decreased use of water, fuel, and fertilizer. In Extension communications, these program-specific data can then be supplemented with statewide indicators showing the number of producers statewide that participated in Extension programs and adopted agricultural recommended practices or reduced fertilizer usage. Thus, the story and the potential impact can be broadened beyond a single crop. In sum, whether the statewide indicators are used to tell the Extension story, in whole or in part, there is a constant need to assess and address data quality across all indicators. The main question to be asked is: Do these data credibly represent Extension's efforts to accurately tell the Extension story and demonstrate impact?

Since launching these statewide indicators in Florida, the number one request from UF/IFAS Extension professionals is a list of the specific survey questions that are tied to each of the statewide indicators. Due to the broadness of the statewide indicators, including the fact that multiple program areas may report under a single indicator, there could be several survey questions created per indicator. The individuals best suited to develop the survey questions are the state faculty and Extension professionals working together on issue-based teams. UF/IFAS is also fortunate to have several evaluation specialists who work with individuals and teams to design measures and evaluation instruments that are reliable and valid. However, their support is limited, given the large number of Extension programs and issue-based teams in their program

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area, as well as having to fulfill research, teaching or other Extension-related duties. Even with this dedicated (although limited) support, for some programs it can take years to develop measures widely accepted and adopted by Extension professionals.

The statewide Extension indicators initiative has prompted renewed energy at UF/IFAS toward identifying common measures and building a repository of survey questions that are vetted by evaluation specialists. Taking it a step further, some Extension teams are mapping statewide program objectives to the statewide indicators to better assist Extension professionals with developing their own program plans of work. In short, adding the indicators to the annual reporting system is telling the Extension professional what the organization values as evidence of successful Extension programming. In turn, the Extension professional then asks, "If that's what I'm supposed to be evaluating, tell me how to measure it."

In a quest for statewide impact data, a greater commitment to using shared, validated evaluation instruments by some Extension teams is an added, and somewhat unexpected, benefit. While building individual evaluation capacity at UF/IFAS is ongoing and necessary (to, at a minimum, provide a foundation for weighing the credibility of the evidence collected), to truly capture program impact for critical issues facing the state, the authors feel that the greater use of common measures is required. Improved evaluation rigor, along with the responses from a larger number of program participants, will allow for more in-depth analysis to produce results and reports that are both credible and actionable.

Focus on Behavior Change

The focus on knowledge gain or intent to change is common evaluation practice among Extension professionals (Franz & Townson, 2008; Lamm, Israel, & Diehl, 2013). It is difficult and costly (in both time and money) to observe or survey participants multiple times months or years after the conclusion of a program. While this is the best way to assess long-term changes in behaviors and practices, and should be promoted in any Extension organization, the reality is that it will be the exception rather than the rule. More often than not, Extension professionals will conduct a pre/posttest or a single survey at the conclusion of the program asking participants if they anticipate changing or have changed certain behaviors or practices as a result of their participation in a workshop or program. However, a post-program survey provides some evidence of changes in behavior and practices that can be tied to research-based outcomes and allow for estimating the economic impact of those changes. A case in point is the use of participants' changing watering practices to estimate gallons of water saved rather than participants' awareness that they *should* change watering practices. The inference from awareness to water savings is not reflected in research or practice. For this reason, the statewide indicators used by UF/IFAS Extension are almost exclusively based on outcomes related to behavior change.

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Here is one example from UF/IFAS that demonstrates the commitment it takes to get to the widespread adoption and reporting of behavior changes. For the past five years, a state faculty specialist in urban water conservation, working with other researchers, has educated Extension professionals on best management practices in program planning and evaluation related to water conservation programming through in-service trainings, individual consultations, publications, and webinars. As a result of these efforts, reporting of gallons of water saved by residential participants (one of the new statewide indicators) has increased from 40 million gallons in 2015 to 300 million gallons in 2018. Each year there has been greater participation among Extension professionals in using the recommended tools for capturing change in specific behaviors (e.g., the use of micro-irrigation, reduced irrigation days) and reporting these data in a consistent manner. To date, 100 Extension professionals have been trained.

Gains in awareness and knowledge, while important in assessing the program's quality, will typically not carry as much weight as behavior change with stakeholders looking for program impact. Of course, stakeholders' expectations vary depending on the program and their level of engagement. On the other hand, flexibility is key to ensure that all program areas are captured by the statewide indicators and also to obtain faculty buy-in (i.e., participation). So, some indicators may focus on awareness or intent to change simply because a program is too new or undeveloped to collect evidence of behavior change, but still address a critical need about which we want to inform stakeholders of our progress. Whether a long-standing program or a relatively new one, engaging with stakeholders on statewide indicators is an opportunity to educate everyone involved on what a program designed to produce behavior change looks like and what is required in terms of time and resources to develop an evidence-based program.

By focusing the statewide indicators on behavior change rather than knowledge gain, there may also be some pushback within the organization. Some Extension professionals will not change their evaluation practice to incorporate behavior change and thus, have no data to report for the statewide indicators. Others may feel their individual work is not reflected or that the indicators understate the organization's body of work. The message here is that the statewide indicators are created to show the impact of Extension on key issues important to the state, but not in all areas. Other work is to be reflected in the individual's annual report of accomplishments.

UF/IFAS's recent emphasis on showing statewide impact, primarily through behavior change, is intended to more effectively "tell our story" and improve our data quality. However, the evidence we collect through this effort will not influence public awareness and decision-making unless it is reported in a way that enables stakeholders to understand the impact of Extension programs. In a world of information-overload, telling the story requires effective packaging, but must begin with a substantial and credible package.

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Infographics

Based on our experience at UF/IFAS, the use of infographics based on well-documented, credible data is one of the best ways to show the impact of Extension. According to Smiciklas' (2012), "[a]n infographic (short for information graphic) is a type of picture that blends data with design, helping individuals and organizations concisely communicate messages to their audience." This definition suits Extension well. According to the Social Science Research Network, about two-thirds of the human population are visual learners (McCue, 2013). With their emphasis on visually appealing layouts and graphics, infographics can quickly bring attention to the key impacts of a program and provide some context. Moreover, studies also suggest that adding visual elements to information improves retention and comprehension (Lankow et al., 2012). Infographics are also easily shared via print or online, and today's digital technology makes infographics well-suited for viewing on mobile devices.

Ideas for infographics can come from a variety of sources that Extension professionals already use to show the impact of their programs, including impact statements typically submitted once a year by Extension professionals for accountability reporting purposes, impact narratives submitted to the national Land Grant Impacts database at https://landgrantimpacts.org, white papers describing long-term research projects that address critical state needs, and stories developed by communications staff. At UF/IFAS, the decision to create an infographic is typically made by the data analyst and the program leader as they learn of programs or projects with positive evaluation data that are scientifically sound and document behavior change. This vetting by the program leader ensures that research or program results that are complex, nuanced, or controversial are more carefully reviewed and crafted. Most evidence of this latter nature is better suited for other communication methods, such as white papers, town halls, and strategic communications campaigns (of which, infographics may also be one of many approaches used to communicate the issue at hand).

Establishing a method for developing infographic ideas on a regular basis is instrumental in building up a central repository of infographics. The process for developing a new infographic at UF/IFAS emphasizes the collaboration between the data analyst and the communications team (i.e., editor and graphic designer), and between the analyst and the primary Extension professional or faculty member who is providing the evaluation data. This process is illustrated in Figure 2, developed by the authors. In this set-up, the data analyst serves as the "bridge" between the Extension professional and the communications staff. During the design and review phase, several versions of the infographic are developed as the information and data are refined through continuous dialogue between the Extension professional, who is vetting the infographic with his or her coworkers and the program's advisory board, partners, clients or funders, and the data analyst, who relays information and edits to the graphic designer. Creating new infographics is time-consuming, so the key is to utilize data and design elements, wherever possible, that can be easily updated each year.

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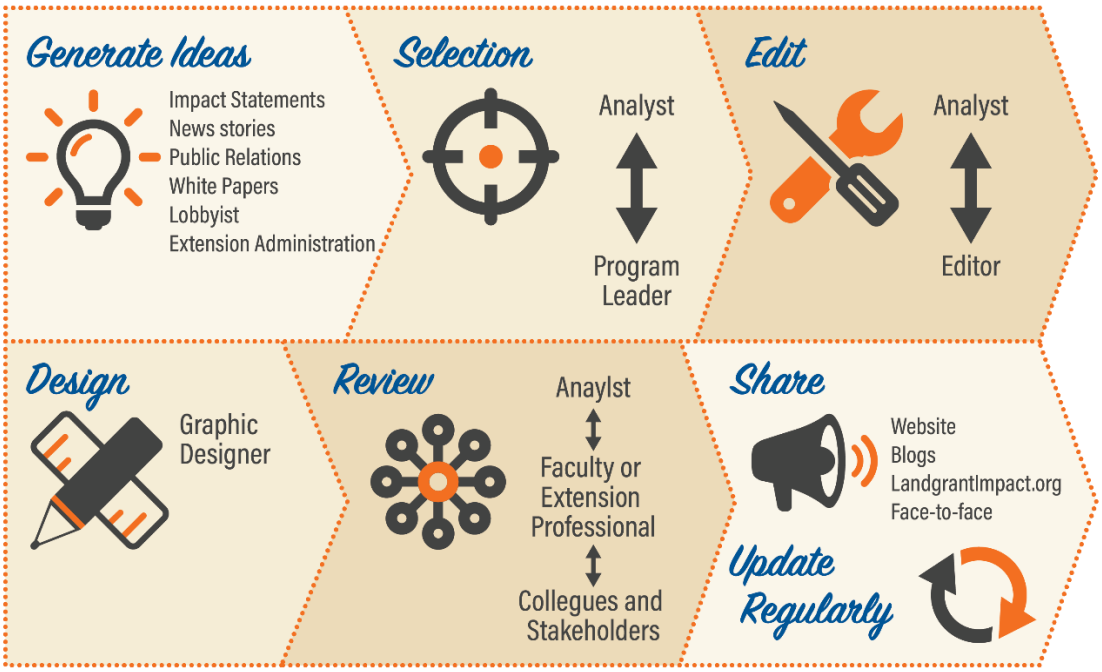
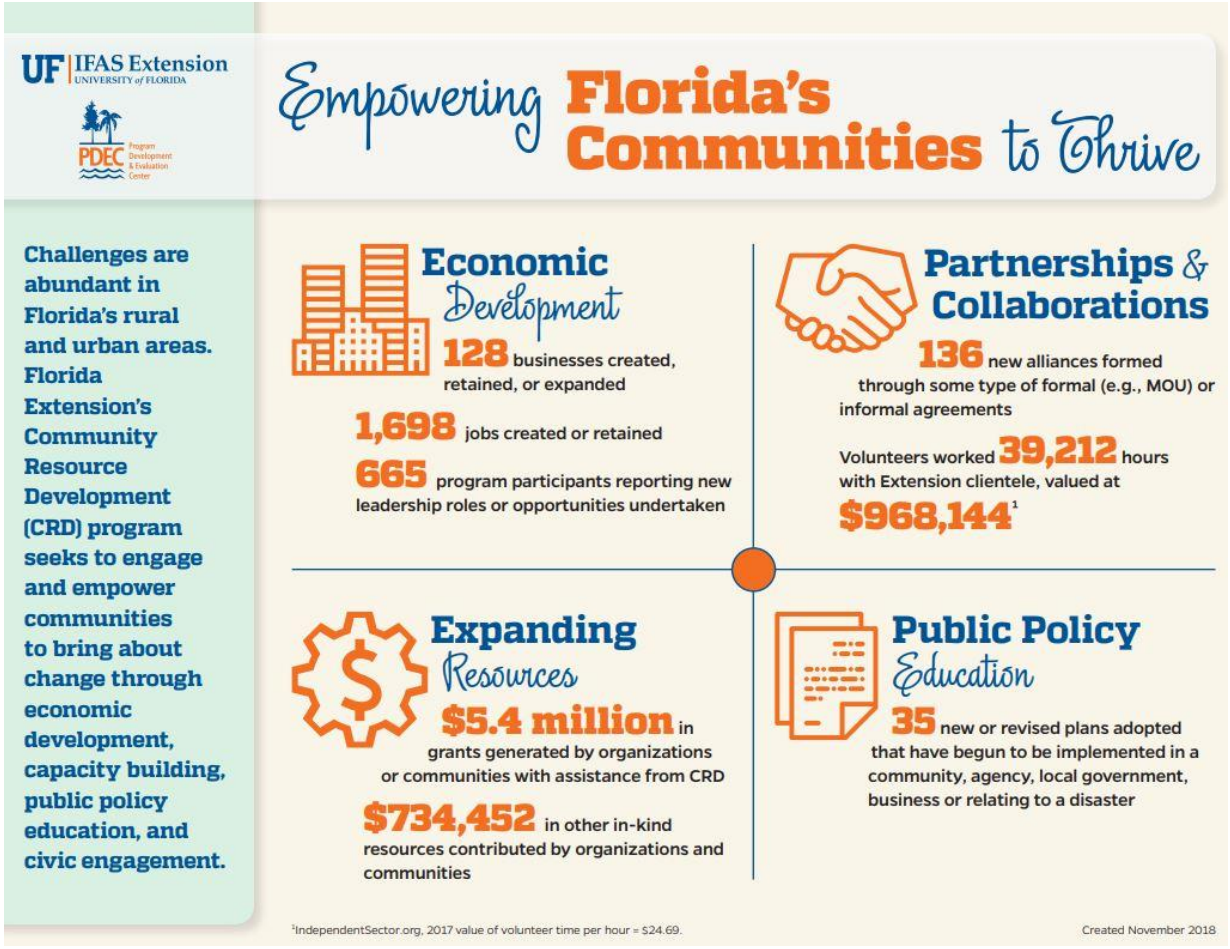
Figure 2. UF/IFAS Process for Developing an Extension Impact Infographic



Note: From UF/IFAS Communications and Program Development and Evaluation Center (2019).

The process described above is used for infographics focused on the impact of specific programs. At times, UF/IFAS has used the statewide indicators data to quickly produce infographics to meet an immediate or specific need. For instance, during the state legislative session, an Extension- or University-employed lobbyist may request information about a certain program area to jump-start a larger discussion. In a recent example, UF/IFAS was able to quickly produce an infographic based on the Community Resource and Economic Development (CRED) national indicators (and replicated in the UF/IFAS statewide indicators), shown in Figure 3. Due to the statewide indicators' broad, general nature and lack of evaluation details, in terms of credibility, statewide indicators are less desirable when details about specific programs are required.

Figure 3. Example of Using Statewide Indicators in Infographics to Show Impact



Note: From Craig, D., Bryant, T. & Palmer, D. (2018a).

Economic Impacts

Economic impact studies are a very popular tool for universities to quantify their impact on the local economy. In 2014, the Association of Public and Land-Grant Universities (APLU) and the Association of American Universities (AAU) produced guidelines for doing such analyses, in part to address the lack of credibility of results being touted by universities and colleges (Ambargis, Mead, Rzeznik, Swenson, & Weisenberger, 2014). At the University of Florida, IMPLAN, a widely used and well-regarded economic impact assessment software system, is used to calculate the economic impact of agriculture and natural resources industries across the state at the county and industry sector level. Mulkey and Hodges (2018) provide a more thorough discussion of IMPLAN and its use. A team of 3-4 UF/IFAS researchers and economists replicate this economic impact study each year, producing a 50-page report that, while valuable, will be read by few stakeholders. To highlight this important work and maximize its value, the data contained in the lengthy report are summarized and published in the following formats:

- A county-specific economic impact sheet with other data, including private gifts from county citizens to the university or UF/IFAS, student enrollment, and clientele contacts (https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/orange.pdf) (Craig & Bryant, 2017);
- The authors' departmental website (https://fred.ifas.ufl.edu/economicimpactanalysis/publications/2016-ag-natural-resources-and-food-industries/;
- A "Fast Facts" data-driven brochure focused on the various industries and commodity groups (https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/pdf/impact/ICS_FloridaAgFactsBooklet2018.web.pdf) (Hodges, Rahmani, & Court, 2018);
- A Return on Investment (ROI) brochure (https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/ROI_Booklet2019.Web.pdf) (UF/IFAS, 2019); and
- An Extension annual report included in Extension calendar (https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/2017ExtensionCalendarAR_Final.pdf) (Craig & Bryant, 2018).

This UF/IFAS study is but one approach to an economic impact analysis of Extension programs. Other universities have also developed effective means to convey the economic impact of Extension. For example, Texas A&M AgriLife Extension (https://agrilifeextension.tamu.edu/about/economic-impact-briefs/) and North Carolina State Extension (https://www.ces.ncsu.edu/how-extension-works/extension-impacts/) have websites devoted to highlighting economic impacts in infographic and other formats.

Economic impact can also be calculated by looking at national studies and data, such as labor statistics, and applying those to the program participant data. For example, in a pesticide licensing infographic (Figure 4) we use the U.S. Bureau of Labor Statistics (BLS) wage estimates for Florida to determine the annual salary differential between being an unlicensed landscape worker and a licensed pesticide applicator. Then we multiply the difference ($8,632/year) by the number of pesticide workers who received new or renewed licenses in that year. Using IMPLAN, the direct benefit of having those workers with higher income in the state is calculated as well as the indirect benefits that arise when they spend those extra dollars in their communities. While not perfect, using IMPLAN does provide a straightforward way to communicate the economic impact of the program to the state. Importantly, this methodology was developed by an economist, and the infographic is vetted with Extension professionals who teach these certification classes and the Florida governmental agency that provides the licensing data each year to ensure this methodology is a reasonable estimate of the program's economic impact.

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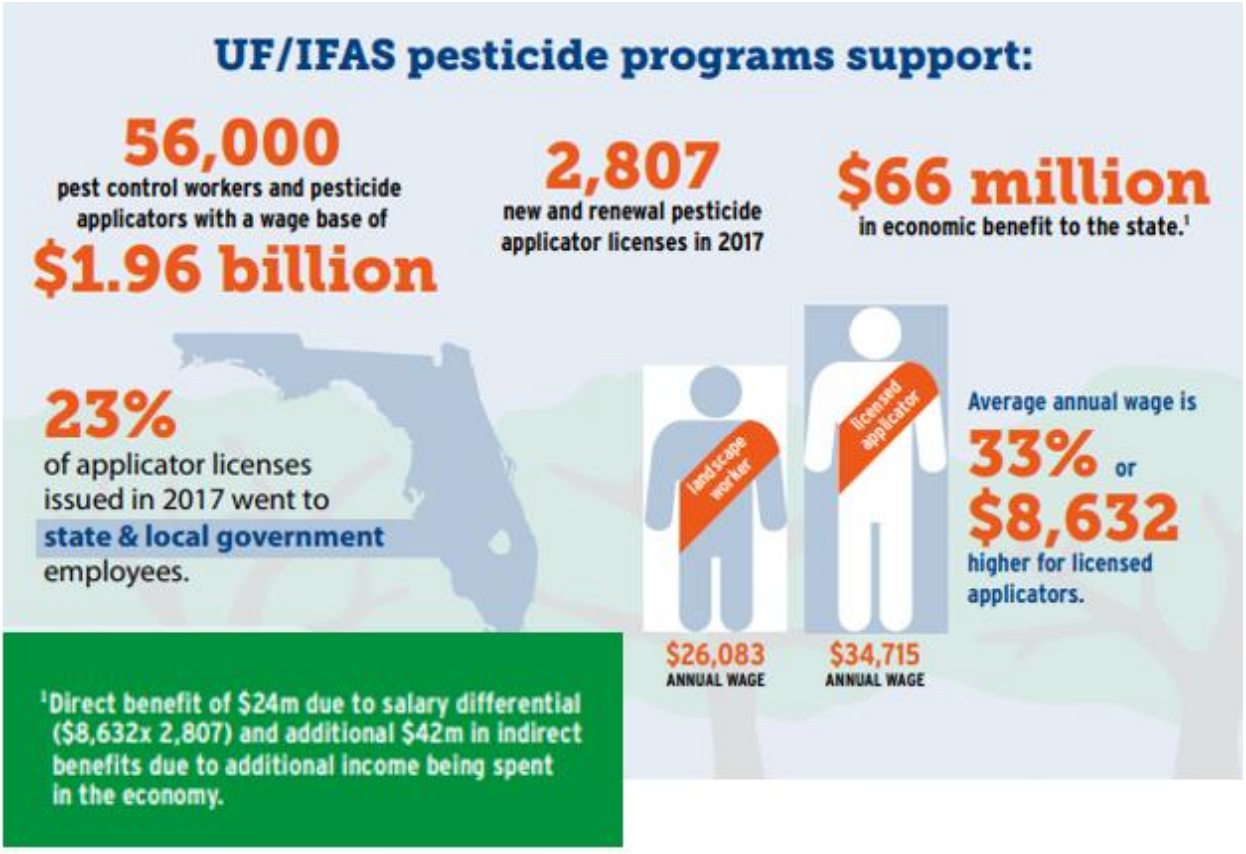
Figure 4. Pesticide Licensing Infographic as Salary Differential Impact Example



Note: Adapted from Craig, D., Bryant, T. & Palmer, D. (2018b).

Client Satisfaction Surveys

Customer or client surveys are another means often used by Extension organizations to assess general satisfaction with programs. At UF/IFAS, customer satisfaction data are used in a variety of publications, including county-level infographics. With valid instruments and a sufficient number of respondents, these types of surveys can be used to produce credible evidence that programs are viewed by participants as effective and useful. This information can also show the reach of a program (i.e., are participants sharing the information they learned with others?). Moreover, it is a clear signal to stakeholders and others that the Extension organization is actively and openly measuring its performance. This willingness to circulate participant feedback broadly can, in turn, increase the organization's credibility and trustworthiness. Among Extension professionals, utilizing customer satisfaction data to improve program implementation is another way to make these data more meaningful (Franz & Archibald, 2018).

For some stakeholders, client satisfaction data by itself may be insufficient to assess the success of the programs or to take action (e.g., continue funding). Also collecting basic information about participants' reported behavior changes or practice adoption through a client satisfaction survey can strengthen the evidence of a program's success for many stakeholders. A simple way

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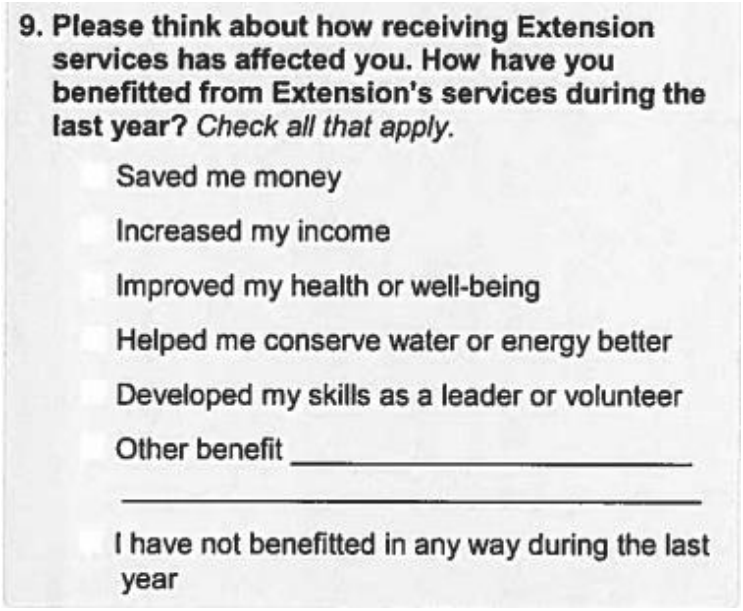
to collect behavior change data that can convey such impact in an infographic is to ask the participants whether they saved money, saved water, improved their health, etc., as illustrated in the question shown in Figure 5. Combining satisfaction data with some behavior change impact data elevates the usefulness of these data by demonstrating to stakeholders that our clients received a direct benefit from their interaction with Extension.

Figure 5. Clientele Benefits Survey Question



Note: Adapted from Israel, G. D. (2018).

Increasing the Credibility of Infographics

Assessing the credibility of evidence is more than just looking at data and methodology alone– one must also consider the source, the reasonableness of what is presented, and the believability of inferences or causal relationships claimed (Schwandt, 2015). While the evidence reported must remain credible, different stakeholder groups may require different approaches as they come with varying levels of knowledge, experience, and passion about the issue or program.

Whether an infographic is demonstrating the impact of a single program or a statewide impact, there are several practical steps one can take to increase the likelihood that the reader will find the evidence credible:

- Provide citations to relevant research;
- Include the methodology used for economic impact estimates;
- Include a logo for the institution and program (when available);
- Use appealing fonts, colors, and images;
- Vet the infographic with state faculty who specialize in the subject area;

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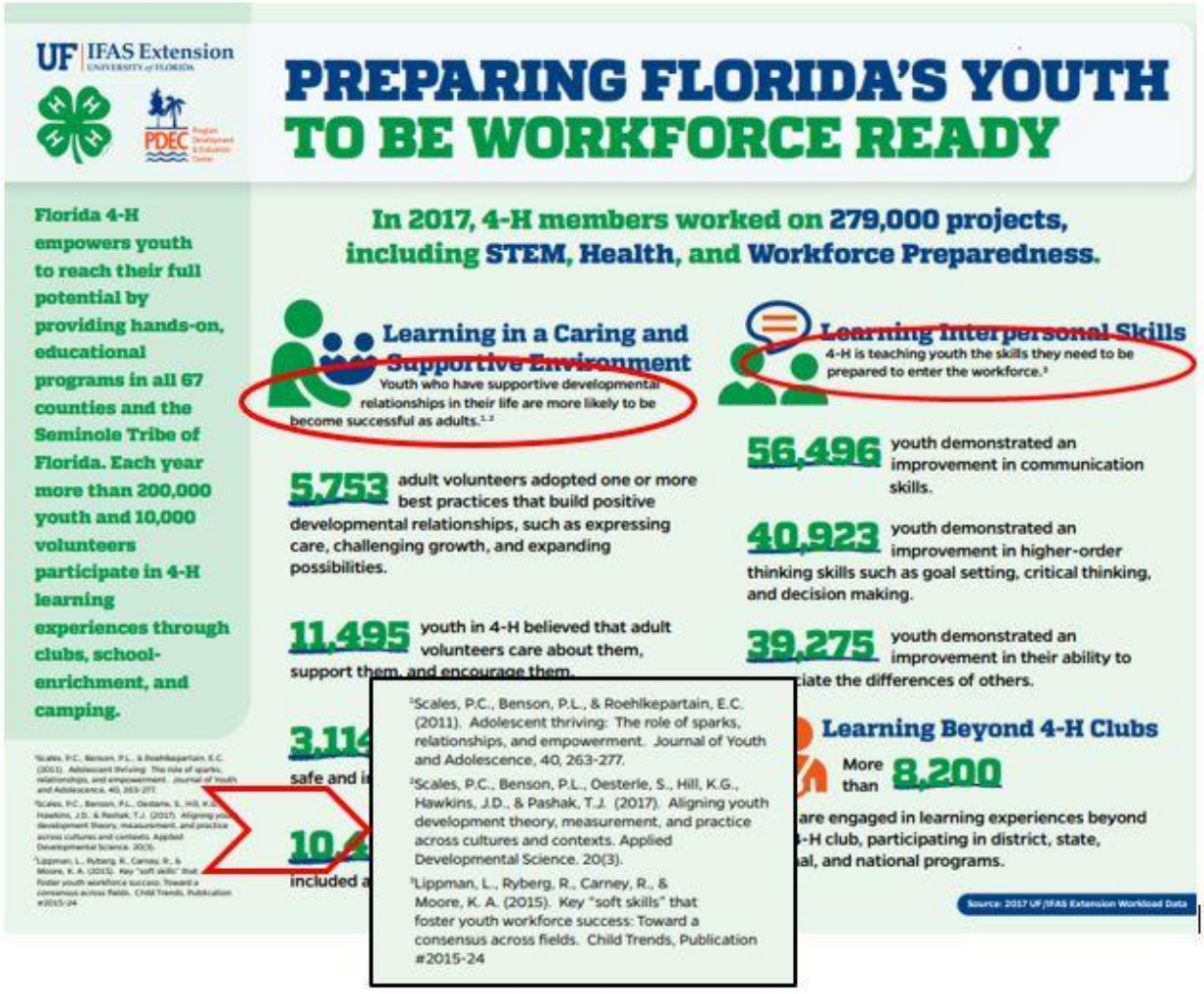
- Vet the infographic with Extension professionals who work directly with the clientele; and
- Indicate the data year(s) and update regularly, if possible (Evergreen, 2018b; Krum, 2014).

Based on the UF/IFAS experience, one of the strongest ways to increase credibility is to support the results presented in the infographic with research findings. Using published studies to demonstrate that the behavior change identified in the indicators can reasonably lead to certain long-term outcomes gives the reader additional context and answers the "so what?" questions. This linkage between program evaluation and research literature, described by Urban and Trochim (2009) as the "golden spike," and illustrated in Figure 6, is important to consider when first developing programs and statewide indicators.

Figure 6. The "Golden Spike" – Connecting Statewide Indicators to Research



Note: Adapted from Craig, D., Bryant, T. & Palmer, D. (2018c).

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The authors provide this 4-H workforce infographic to illustrate the general concept of linking infographic results with research and recognize that it is not necessarily a strong example of an empirical linkage between evaluation and research. Work continues at UF/IFAS to develop infographics better representing this concept.

Many Extension programs, such as 4-H and Master Gardeners, have positive public perceptions and familiar logos. Connecting lesser-known Extension programs with universities, which are seen by most people as trustworthy, is also beneficial. Adding a well-designed logo for the program or other related images, along with other appealing "surface characteristics" conveys professionalism and improves credibility (Miller, 2015).

Using website and logo designs as the principle communication vehicle for presenting information, Lowry et al. (2014) propose that if a consumer interacts with a website and perceives trustworthiness and expertise in the website, the consumer will likely perceive trustworthiness and expertise in the organization represented by the website. For example, if a website is consistent in design with reassuring colors and stable shapes, the organization increases its perceived trustworthiness. Trusting the source of the information is an important step toward finding the stated evidence itself to be credible (Miller, 2015).

Typically, the infographic is developed with a single state faculty member or Extension professional. Encourage the contributor to circulate the infographic among their peers and their program leader prior to finalizing. Encourage Extension professionals to show it to their advisory board or influential clientele. These individuals, inside and outside the organization, will help ensure that the data, methodology, text, and even choice of images is seen as credible to stakeholders. Mathison (2015) notes the importance of verifying whether the images used in evaluation are viewed similarly by all parties–evaluator, stakeholder, and viewer/reader. This verification is especially important when disseminating infographics broadly on blogs and social media.

Infographics without any dates or with very old information may reduce the credibility of the information for some readers. Timestamps are a shortcut for assessing relevance. A missing date conveys a lack of transparency and may frustrate the reader as they are spending time looking for a date rather than looking at the information itself. Indicating when an infographic was created or updated is an easy way to increase the chances the infographic is viewed as credible.

Actionable Evidence

To get the most out of any infographic, report or presentation showing evidence of the impact of Extension, the key is to use an effective messenger who is familiar with both the stakeholder and the evidence presented. For telling the Extension story, the goal in most cases is to have the stakeholder take positive action (fund or advocate for the program) or *not* take negative action

(defund or oppose the program). The degree to which the evidence presented in an infographic or other communication vehicle is sufficient for a stakeholder to take such action depends on credibility, relevance, and comprehensiveness (Mark, 2015). Asking all of these of a one-page infographic is likely being too optimistic, especially with well-informed and experienced stakeholders. However, university-paid lobbyists and Extension administrators and professionals who work directly with county administrators and other funders can take full advantage of an infographic's pared-down message by using it as a tool to initiate a dialogue about funding levels, new directions to take, or programs to add.

The following are ways that UF/IFAS has strived to increase the actionability of an infographic:

- Select timely and relevant programs or topics,
- Tailor messages to specific stakeholder groups,
- Include several data points or themes to increase chances of "grabbing their interest,"
- Provide a print version in PDF format, and
- Post in multiple places (e.g., website, blogs, news feeds, dean's message).

Beyond this targeted and strategic outward use of infographics, Extension professionals are also often in need of infographics and other demonstrations of impact for responding to ad hoc requests from university administrators or trustees, government officials, lobbyists, etc. Having a repository of infographics on statewide programs or critical issues and promoting them through websites, blogs, and social media encourages easy access by Extension and other land-grant university personnel for immediate use and distribution.

Working with Communications Professionals

Effectively communicating Extension's story requires data that are credible and relevant but also accessible. If the data are not presented in a clear, concise, and consistent way using methods that are familiar or comprehensible to a non-academic audience, then the effort of collecting and interpreting the data is of limited value. Most land-grant universities have professional communications departments to manage the communications efforts needed to distribute information to stakeholders. These units have developed into strategic partners that design and implement integrated communications and marketing programs that identify, establish, and cultivate stakeholder relationships that are mutually beneficial to the Extension program and its stakeholders.

Partnerships between data analysts, who collect and analyze accountability and other data from Extension professionals and Extension or university communicators result in products that not only connect and resonate with audiences but also prioritize the data with the most relevance for the intended stakeholder. Moreover, communications units have access to the software and expertise that allow for information to be created once and then distributed among multiple platforms. This "create once, curate often" strategy is effective in sharing important information

on a regular, consistent schedule. For example, Florida Extension has information on the number of gallons of water saved due to participation in UF/IFAS Extension urban landscape programs. This impact statistic is repeated in the UF/IFAS Extension calendar, displayed in infographics, used on the web, is the topic of social media posts, is featured in a report to the state legislature, and is used in PowerPoint presentations, speeches, op-eds, etc.

Just as with any successful partnership, working with communicators and data analysts takes time, patience, collaboration, and mutual respect. Successful collaborations often start with time to explain the process of creating the work product. Understanding how each other works in this partnership not only streamlines the process but also establishes trust.

Some of the typical questions that are addressed between the communicator and the data analyst include:

- What is involved in creating an infographic?
- How do I distill information into an annual report graph?
- How do you collect the impact and outcome information?

Once there is a basic understanding of each other's role and capabilities, collective brainstorming can result in an agenda of ideas and opportunities that may be developed. Communications divisions often have a rolling calendar of scheduled publications such as annual reports, calendars, briefing reports, and web updates that need content to communicate the impact that the Extension programs deliver. Program impact data and evidence may also be plugged into those content calendars for consistent exposure.

Options for Low Support Environments

Many of the ideas described thus far come from the perspective of a large, major research university with dedicated communications and marketing staff. Some organizations do not have ready access to such staff and fewer resources in general. For those with limited access to graphic designers, there are several free or low-cost infographic templates available online, including Piktochart, Canva, Visme, and Vennage. For more customization and the ability to use data-merge to create multiple versions of the same infographic (e.g., region or county level), Scribus (and the add-on ScribusGenerator) is a free desktop publishing tool similar to Adobe InDesign, software commonly used by professional graphic designers. The learning curve for Scribus is higher, but worth it if the infographic is one that will be updated on a regular basis. To get started quickly, without learning new software, one may want to consider hiring a graphic designer through a low-cost, freelance site like fiverr or guru. However, freelance graphic design services only cover the layout of the infographic and not the content.

While good graphic design is vital to producing a credible infographic or other communication vehicle, the writing and fine-tuning that is required to get to the essence of a program's outcomes

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and impacts are equally important. For those who lack these skills and cannot recruit or hire a student or someone in the organization to help, there are freelance content writers available online, but it may take a lot of searching and several hires to find the right person. Because the content may need to be vetted and refined with several people in the organization, it is unlikely that freelancing is the best solution for creating infographic content. Regardless of whether this work is done in-house or not, it is important to review the content with program leaders, specialists, and Extension professionals before starting the design process.

Interactive Data Visualization

Thus far, our article has focused primarily on communicating impact through infographics, a static form of data visualization. However, Extension can also display data in more dynamic, interactive ways (Lankow et al., 2012). Online data dashboards that display key metrics and allow the user to filter and easily compare data are becoming increasingly popular in today's technology-savvy society. Businesses have used this type of data visualization internally for decades, but widespread use began in the early 2000s as Microsoft Excel charting improved and new desktop software designed for a non-technical user became available. Today, many universities and colleges are using interactive data dashboards for their "university factbook" (i.e., student enrollment, faculty and staff counts, degrees awarded, etc.) and graduate exit or other student-focused surveys. Among these higher education users, the most popular data visualization software is Tableau, followed by Microsoft Power BI.

Data dashboards are typically more exploratory in nature than infographics, which are explanatory (Knaflic, 2015; Lankow et al., 2012). A designer can create a dashboard that "walks" the user through a storyline, but the fixed infographic, which is highlighting specific data and content, is a more direct route to communicating impact. In a dashboard that features a lot of interactivity, the user can get sidetracked as they explore the data and possibly miss the story the designer was trying to tell.

Data visualization software such as Tableau is ideal for analyzing "big data," which are very large data sets with a lot of detailed information. These data may be real-time (i.e., coming directly from a reporting system or web server) or a fixed data set (e.g., an Excel spreadsheet). Many types of collected assessment, monitoring, and evaluation data can be visualized to identify trends, patterns, and programmatic impact. For example, the Program for Resource Efficient Communities at the University of Florida collects energy use data from thousands of Florida homes and uses statistical packages and data visualization to identify effective energy efficiency measures. Utilizing these "big data" together with Extension clientele contacts could provide some interesting dashboards for stakeholders and the general public. Further, by generating charts and data at the county level, one could produce an infographic for every county in the state. By using some of these techniques and playing the role of "data broker," Extension can increase its relevance and worth to county governments and others.

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To the best of our knowledge, very few land-grant universities use these interactive data visualization tools for their Extension efforts. The examples we discovered through a search of Tableau Public (free version of Tableau, http://public.tableau.com) and Google, or via word-of-mouth, focus mainly on reporting clientele contacts or demographics rather than evaluation data or impacts and are provided in Table 2.

Table 2. Examples of Extension-related Data Dashboards and Visualizations

Institution, Organization, or System	Description of Data Visualization Usage
University of New Hampshire's Logic Model Planning and Reporting System (LMPRS)	LMPRS is shared by six institutions and uses Tableau Public for some limited data visualization of accountability data such as clientele contacts and demographics.
Kansas State University's Program Evaluation and Reporting System (PEARS)	PEARS is used by 25 states for SNAP-Ed evaluation and includes a data dashboard (i.e., an organized display of data on a page or pages) and some geographic data mapping built into the system.
North Carolina State University Extension	Their "County Profile" approach nicely packages a lot of demographic, economic, and other data helpful in needs assessments into a set of interactive dashboards housed on Tableau Public.
UF/IFAS Program Development and Evaluation Center (PDEC)	PDEC has a profile on Tableau Public and has created several data visualizations over the years for various purposes including sharing survey results and data exploration.
National Institute of Food and Agriculture (NIFA)	The Leadership Management Dashboard is available through the NIFA Reporting Portal at https://portal.nifa.usda.gov, but it is limited to a single display of competitive and capacity grants by congressional district.
USDA Economic Research Service (ERS)	ERS has several visualizations, primarily related to ag economics, available online at https://www.ers.usda.gov/data-products/data-visualizations

For those interested in building charts and dashboards with Extension data, both Tableau and Power BI offer free versions of their software and YouTube overflows with how-to videos for building dashboards using Microsoft Excel. The learning curve is high in using data visualization tools, especially in getting the data in the right format (known as data shaping and

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modeling). When working with data visualization, the vast majority of effort will be collecting the data, cleaning it, and setting it up so that the tools work properly and efficiently.

The free versions of Tableau and Power BI have limited sharing capability, so wide use of the tools for your organization would likely require purchasing an upgraded version of the software. Besides the costs, which can be quite high in rolling out to a large university, data visualization requires much more participation from the users. For this reason, administrators and stakeholders often do not fully engage with the tools or use them regularly. The best way to increase stakeholder use of these tools is to make sure you deliver data that meets their needs, is simple to understand, and runs efficiently on the system (i.e., no long lag times to generate the charts).

Regardless of the software used to visualize data, there are many books and online resources available for advice and best practices in creating effective charts and graphs for reports, infographics, presentations, etc. (Evergreen, 2017; Knaflic, 2015). Stephanie Evergreen's website hosts a popular blog and a useful, interactive tool to rate the quality of a chart or graph based on her data visualization checklist (Evergreen, 2018a).

Conclusion

Collecting and packaging data to show impact is no small task. Often, the work required is seen as too large a task, so it never gets done. However, the demand for demonstrating impacts is growing, and there is no evidence that this demand will subside anytime soon. Given this trend for more accountability, and in an environment known for tight budgets, the Extension components of land-grant universities need to work more efficiently to tell the Extension story. Many Extension organizations already collect data, such as clientele contacts, customer satisfaction surveys, and 4-H Common Measures, and can begin creating infographics or data dashboards using those data. The use of statewide Extension indicators, such as those created in Florida, offers a practical and relatively low-cost way to show impact across a state on critical issues. The continuous vetting and assessment of the data being reported by Extension professionals will help ensure that data quality will improve over time. Efforts in creating and distributing credible evidence can be leveraged by displaying data in multiple infographics, distributed through multiple channels. Extension organizations are encouraged to identify key programs or imminent legislative priorities to be promoted through the use of infographics.

Technology is rapidly changing, and the need for expertise in communication methods is more important than ever. Working with communications professionals to produce high quality, visual materials (including websites and infographics) is ideal, but there are several free tools available to help you get started even without this support. While the technical expertise that a communications staff can provide is invaluable, even more important is their proficiency in promoting and distributing your work. If no one sees the infographic, it does not matter how effective or beautiful it is. So also seek out those individuals in your organization who can help

you get your message out. Most likely, those same individuals also feel the pressure to provide the answers to the "So what?" questions, need data, and will be receptive to a collaborative effort.

This article highlights work being done at the University of Florida. Many land-grant institutions are also telling the Extension story through infographics, websites, data visualization, etc. To promote the sharing of infographics, the authors have created a website at http://pdec.ifas.ufl.edu/credibleinfographics/ that houses examples of the different ways in which the Extension story may be told using credible and actionable evidence. We encourage you to send infographics you have developed and want to share with your peers to the contact email listed on the website. All of us can learn from each other–and what better way than visually.

References

Edelman. (2018). *2018 Edelman trust barometer.* Chicago, IL: Edelman. Retrieved from http://www.edelman.com/trust-barometer

Ambargis, Z., Mead, C. I., Rzeznik, S. J.; Swenson, D., & Weisenberger, J. (2014). *Economic engagement framework: Economic impact guidelines*. Washington, DC: Association of Public and Land-grant Universities and Association of American Universities. Retrieved from https://eric.ed.gov/?id=ED555635

Association of Governing Boards of Universities and Colleges. (2018). *Public confidence in higher education*. Washington, DC: Association of Governing Boards of Universities and Colleges. Retrieved from https://www.agb.org/reports/2018/public-confidence-in-higher-education

Craig, D. & Bryant, T. (2017). *Orange County* [Infographic]. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/orange.pdf

Craig, D. & Bryant, T. (2018). *2017 UF/IFAS Extension impacts and budget annual report* [Infographic]. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/2017ExtensionCalendarAR_Final.pdf

Craig, D., Bryant, T., & Palmer, D. (2018a). *Empowering Florida's communities to thrive* [Infographic]. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://pdec.ifas.ufl.edu/impacts/crd.pdf

Craig, D., Bryant, T., & Palmer, D. (2018b). *Improving Florida's workforce, economy and natural resources* [Infographic]. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://pdec.ifas.ufl.edu/impacts/pesticidetraining.pdf

Craig, D., Bryant, T., & Palmer, D. (2018c). *Preparing Florida's youth to be workforce ready* [Infographic]. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://pdec.ifas.ufl.edu/impacts/4hworkforce.pdf

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Cutlip, S. M., Center, A. H., & Broom, G. M. (1985). *Effective public relations*. Englewood Cliffs, NJ: Prentice-Hall.

Evergreen, S. D. H. (2017). *Effective data visualization: The right chart for the right data.* Thousand Oaks, CA: Sage.

Evergreen, S. D. H. (2018a). *Data visualization checklist* [Interactive tool]. Retrieved from https://datavizchecklist.stephanieevergreen.com/rate

Evergreen, S. D. H. (2018b). *Presenting data effectively: Communicating your findings for maximum impact* (2nd ed.). Los Angeles, CA: Sage.

Franz, N. K. (2013). Improving Extension programs: Putting public value stories and statements to work. *Journal of Extension, 51*(3), Article 3TOT1. Retrieved from https://www.joe.org/joe/2013june/tt1.php

Franz, N., & Archibald, T. (2018). Four approaches to building Extension program evaluation capacity. *Journal of Extension, 56*(4), Article 4TOT5. Retrieved from https://joe.org/joe/2018august/tt5.php

Franz, N. K., Arnold, M., & Baughman, S. (2014). The role of evaluation in determining the public value of Extension. *Journal of Extension, 52*(4), Article 4COM3. Retrieved from https://joe.org/joe/2014august/comm3.php

Franz, N., & Townson, L. (2008). The nature of complex organizations: The case of Cooperative Extension. In M. T. Braverman, M. Engle, M. E. Arnold, & R. A. Rennekamp (Eds.), *Program evaluation in a complex organizational system: Lessons from Cooperative Extension. New Directions for Evaluation, 120,* 5–14. San Francisco, CA: Jossey-Bass. doi:10.1002/ev.272

Harder, A., Lamm, A., & Galindo, S. (2018). *Finding grant opportunities to support county Extension programs*. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://edis.ifas.ufl.edu/wc134

Harder, A., Moore, A., Mazurkewicz, M., & Benge, M. (2013). Problems impacting Extension program quality at the county level: Results from an analysis of county program reviews conducted in Florida. *Journal of Extension, 51*(1), Article 1RIB2. Retrieved from https://joe.org/joe/2013february/rb2.php

Hitlin, P. (2018). *Internet, social media use and device ownership in U.S. have plateaued after years of growth* [Blog post]. Washington, DC: Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2018/09/28/internet-social-media-use-and-device-ownership-in-u-s-have-plateaued-after-years-of-growth

Hodges, A., Rahmani, M., & Court, C. (2018). *Florida agriculture: Fast facts 2018* [Brochure]. Gainesville, FL: University of Florida Institute for Food and Agricultural Sciences. Retrieved from https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/pdf/impact/ICS_FloridaAgFactsBooklet2018.web.pdf

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Israel, G. D. (2018). *Florida Cooperative Extension Service's customer satisfaction survey protocol.* Gainesville, FL: University of Florida Institute for Food and Agricultural Sciences. Retrieved from https://pdec.ifas.ufl.edu/satisfaction/CSS%20Protocol%20-%202019.pdf

Jiang, X. (2016). *Designing and communicating trust: How nonprofits can use design to better communicate their trustworthiness* (Master's thesis). Retrieved from https://pdfs.semanticscholar.org/cfbe/525b5a6b4d02a0bee2ac33837ad84992452a.pdf

Knaflic, C. N. (2015). *Storytelling with data: A data visualization guide for business professionals.* Hoboken, NJ: John Wiley & Sons.

Krum, R. (2014). *Cool infographics: Effective communication with data visualization and design.* Indianapolis, IN: John Wiley & Sons.

Lamm, A. J., Israel, G. D., & Diehl, D. (2013). A national perspective on the current evaluation activities in Extension. *Journal of Extension, 51*(1), Article 1FEA1. Retrieved from https://joe.org/joe/2013february/a1.php

Lankow, J., Ritchie, J., & Crooks, R. (2012). *Infographics: The power of visual storytelling.* Hoboken, NJ: John Wiley & Sons.

Lowry, P. B., Wilson, D. W., & Haig, W. L. (2014). A picture is worth a thousand words: Source credibility theory applied to logo and website design for heightened credibility and consumer trust. *International Journal of Human-Computer Interaction, 30*(1), 63–93. doi:10.1080/10447318.2013.839899

Mark, M. M. (2015). Credible and actionable evidence: A framework, overview, and suggestions for future practice and research. In S. I. Donaldson, C. A. Christie, & M. M. Mark (Eds.), *Credible and actionable evidence: The foundation for rigorous and influential evaluations* (2nd ed., pp. 275–302). Thousand Oaks, CA: Sage.

Mathison, S. (2015). Seeing is believing: Using images as evidence in evaluation. In S. I. Donaldson, C. A. Christie, & M. M. Mark (Eds.), *Credible and actionable evidence: The foundation for rigorous and influential evaluations* (2nd ed., pp. 157–176). Thousand Oaks, CA: Sage.

McCue, T. J. (2013, January 8). Why infographics rule. *Forbes*. Retrieved from https://www.forbes.com/sites/tjmccue/2013/01/08/what-is-an-infographic-and-ways-to-make-it-go-viral/#791758417272

Miller, R. L. (2015). How people judge the credibility of information. In S. I. Donaldson, C. A. Christie, & M. M. Mark (Eds.), *Credible and actionable evidence: The foundation for rigorous and influential evaluations* (2nd ed., pp. 39–58). Thousand Oaks, CA: Sage.

Mitchell, A., Gottfried, J., Barthel, M., & Shearer, E. (2016). *The modern news consumer: News attitudes and practices in the digital era.* Washington, DC: Pew Research Center. Retrieved from http://www.journalism.org/2016/07/07/the-modern-news-consumer

Mulkey, D., & Hodges, A. (2018). *Using Implan to assess local economic impacts*. Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences. Retrieved from https://edis.ifas.ufl.edu/fe168

Journal of Human Sciences and Extension Volume 7, Number 2, 2019

Communicating with Data: Telling the Extension Story in Credible and Actionable Ways 173

North, E. G. (2011). *Extension brand value: Lessons learned from the Copernicus study.* Presentation at the Southern Region Program Leaders Network, Fort Worth, TX. Retrieved from https://slideplayer.com/slide/6935305

Olson, J. R., Welsh, J. A., & Perkins, D. F. (2015). Evidence-based programming within Cooperative Extension: How can we maintain program fidelity while adapting to meet local needs? *Journal of Extension, 53*(3), Article 3FEA3. Retrieved from https://www.joe.org/joe/2015june/a3.php

Rennekamp, R. A., & Engle, M. (2008). A case study in organizational change: Evaluation in Cooperative Extension. In M. T. Braverman, M. Engle, M. E. Arnold, & R. A. Rennekamp (Eds.), *Program evaluation in a complex organizational system: Lessons from Cooperative Extension. New Directions for Evaluation, 120,* 15–26. doi:10.1002/ev.273

Schwandt, T. A. (2015). Credible evidence of effectiveness: Necessary but not sufficient. In S. I. Donaldson, C. A. Christie, & M. M. Mark (Eds.), *Credible and actionable evidence: The foundation for rigorous and influential evaluations* (2nd ed., pp. 259–273). Thousand Oaks, CA: Sage.

Smiciklas, M. (2012). *The power of infographics: Using pictures to communicate and connect with your audiences.* Indianapolis, IN: Que Publishing.

Tufte, E. R. (2006). *Beautiful evidence*. Cheshire, CT: Graphics Press.

University of Florida Institute of Food and Agricultural Sciences (UF/IFAS). (2019). *Public investment in UF/IFAS yields significant economic benefits and jobs, 2018* [Brochure]. Retrieved from https://ifas.ufl.edu/media/ifasufledu/ifas-dark-blue/docs/ROI_Booklet2019.Web.pdf

Urban, J. B., & Trochim, W. (2009). The role of evaluation in research-practice integration: Working toward the "Golden Spike." *American Journal of Evaluation, 30*(4), 538–553. doi:10.1177/1098214009348327

U.S. Department of Agriculture, National Institute of Food and Agriculture (USDA-NIFA). (2011). *National outcomes and indicators: AREERA plan of work reporting system*. Retrieved from https://nifa.usda.gov/sites/default/files/resource/Natl%20Outcomes%20%26%20Indicators%20Listing.pdf

U.S. Department of Agriculture, National Institute of Food and Agriculture (USDA-NIFA). (2015). *Generic logic model for NIFA reporting.* Retrieved from https://nifa.usda.gov/resource/generic-logic-model-nifa-reporting

Wiles, J. (2017). *How to choose the right communications channel* [Blog post]. Stamford, CT: Gartner. Retrieved from https://www.gartner.com/smarterwithgartner/corporate-communications-four-steps-to-choosing-the-right-communication-channel

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