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Identifying the Behavioral Intent to Use Social Media through the application of UTAUT in ANR and Turfgrass Extension

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Abstract

Little research exists on the role Extension Agricultural and Natural Resources professionals play in communicating information about new turfgrass cultivars. In an effort to analyze behavioral intentions related to social media and its use in the turfgrass industry, the researchers drew from the unified theory of acceptance and use of technology (UTAUT). A pilot instrument was developed to measure the intent of University researchers and county-based Extension professionals to use social media to disseminate turfgrass information, as well as their use of social media for seeking turfgrass information. This case study examined the role of county-based ANR Extension professionals across six states, analyzing their role as either creators or disseminators of ANR and turfgrass information, their intent to use social media, and their use of these communications to engage with ANR and turfgrass information. Findings of this study show that Facebook is the primary communications channel used by county-based Extension professionals. Further, it has been determined that the role of the county-based Extension professional in "creating" verses "using" previously established research-based information to disseminate to clientele is not well-defined. Broader implications include examination of performance expectations of county-based personnel related to their use of social media for communicating turfgrass information.

Keywords

communication, agriculture and natural resources, Extension Agent, behavioral intent, turfgrass

Cover Page Footnote/Acknowledgements

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Introduction

The turfgrass industry contributes upwards of $40 billion to the United States economy and $7.8 billion to the Georgia economy (National Turfgrass Federation, 2017; Waltz, 2020). Turfgrass is a global agriculture and natural resources (ANR) commodity with a defined population of individuals and companies involved in production, management and maintenance, and personal and professional use (National Turfgrass Federation, 2017; Waltz, 2020). University turfgrass researchers around the world work to create new cultivars that are more conducive to varying environmental and contextual conditions that can withstand a variety of recreational and professional uses (Breuinger et al., 2013; Chawla et al., 2018; Santos & Castilho, 2018). Extension professionals then obtain information regarding these turfgrass innovations and communicate it to various stakeholders (Patton et al., 2013). While the ways in which Extension professionals communicate information and share innovations via social media are well-researched, little exists on the role Extension professionals play in communicating information specifically about new turfgrass cultivars through the use of social media.

Exposure of specific cultivars in high-profile settings, such as at premier sporting event venues, provides some esteem to the research university (Keuler, 2014). Whereas the existence of these cultivars is often recognized solely through marketing from distributers, the message being communicated is limited to the context in which these cultivars are used, and the communication channels through which the use is shared. However, communicating the specific benefits of turfgrass innovations through messages and communication channels is not as straightforward as advertising and marketing, nor necessarily demonstrated through such means (Chawla et al., 2018; Ruth et al., 2018).

Therefore, various factors should be considered when communicating turfgrass innovations: the needs of end-users and how those needs may vary depending on one's role within the industry, as well as perceived observability, complexity, compatibility, relative advantage, and trialability of the innovation. Additionally, how information regarding emerging cultivars is disseminated differs depending on the role of the sender (Ruth et al., 2018; Worley et al., 2022). Ghimire et al. (2019) further note that while environmental and economic factors are taken into consideration during the development of new cultivars, a gap in communicating these benefits exists between breeders, producers, and ultimately end-users. Determining the message to be delivered through the appropriate communication channel, coupled with an understanding of end-user receptibility and needs, is essential so that university professionals can most effectively share the benefits and innovations of turfgrass cultivars (Ruth et al., 2018).

In previous research, a team from the University of Georgia examined turfgrass industry strata to determine key decision-makers and most influential individuals, and the current and future messages for sharing regarding turfgrass innovations (Worley et al., 2021; Worley et al., 2022). Extension/Outreach and Communications professionals in ANR were studied and results indicated that factors including the culture of Extension within a state, as well as the professionals' use of communications, influenced how turfgrass information was disseminated. The purpose of this study was to identify the role of the University researchers and county-level Extension professionals as *creators* (establishing the research-based knowledge as well as crafting the communications conveying this information) and *disseminators* (sharing the communications) of turfgrass information via social media. It is important to understand how Extension professionals at the University and county-level view their role in using social media to provide information on turfgrass innovations; establishing the most appropriate source

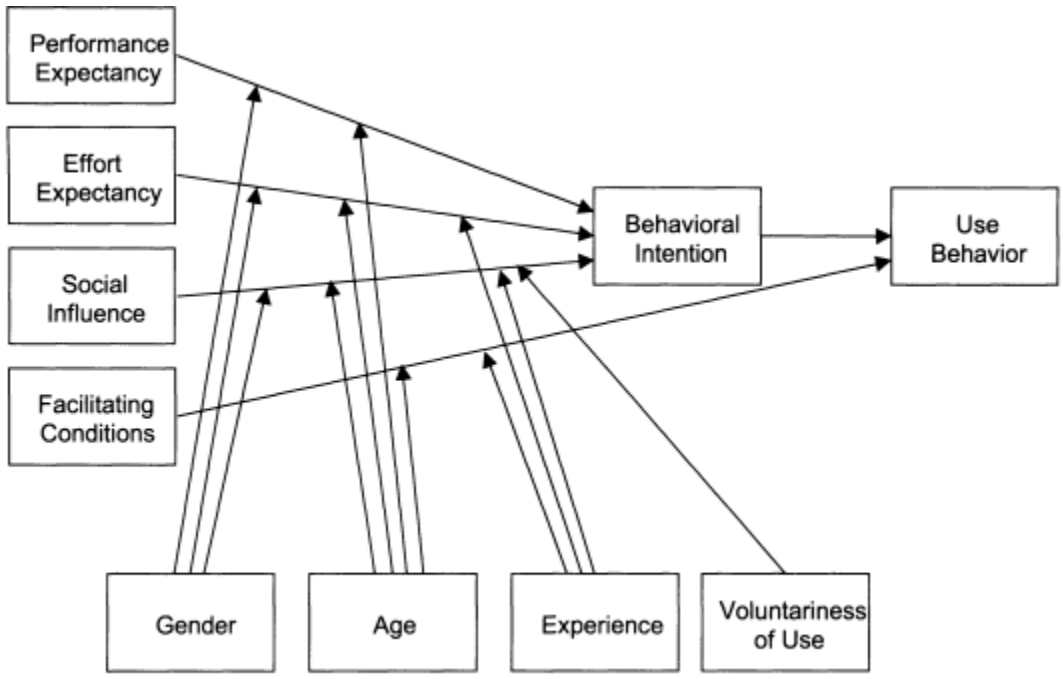
responsible for the creation of information regarding turfgrass innovations, and subsequently those best suited for its dissemination, would allow for a concise approach to information delivery.

Theoretical Framework

Ajzen (1991) suggests that one's intention to engage in a behavior is positively correlated with actual behavioral engagement. In the context of this study, ANR Extension professionals were studied to examine their intent to use social media for engaging with and disseminating turfgrass information, where, *engaging* implied using social media to obtain turfgrass information, and *disseminating* turfgrass information involved the ANR Extension professionals' use of social media for sharing information. In an effort to analyze behavioral intentions as they relate to the use of technology, specifically social media and its use in the turfgrass industry, the work of Moreno-Ortiz (2018) offered promise in the context of social media use. Specifically, Moreno-Ortiz (2018) analyzed the acceptance and use of social media to advertise and promote agriproducts in rural farming communities in Northern Mississippi using the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003). Figure 1 displays Venkatesh et al.'s (2003) original research model of the UTAUT and informed the data collection and interpretation in the current study.

Figure 1

Unified Theory of Acceptance and Use of Technology (UTAUT) Research Model



Note. Figure from Venkatesh et al. (2003)

The UTAUT was formed through the integration of components of several previously recognized theories (including the theory of planned behavior and diffusion of innovations),

constructed to explain the behavior and intent to use information systems (Moreno-Ortiz, 2018). The basis of the UTAUT, built from these seminal theories, is that an individual's reaction to using technology is based on intent and the actual use; the subsequent use, in turn, impacts the individual's reaction (Venkatesh et al., 2003). The model consists of four constructs for determining behavioral intentions and subsequently actual use behaviors: performance expectancy, effort expectancy, social influence, and facilitating conditions.

Performance expectancy is defined as "the degree to which an individual believes that using the system will help…attain gains…" and is comprised of *perceived usefulness, extrinsic motivation, job-fit, relative advantage,* and *outcome expectations* (Venkatesh et al., 2003, p. 447). Effort expectancy is the ease of using the system and includes *perceived ease of use*, *complexity,* and *ease of use* as core tenants. Social influence is "the degree to which an individual perceives that important others believe he or she should use the new system" and is represented as *subjective norm, social factors,* and *image* (Venkatesh et al., 2003, p. 451). Facilitating conditions are the "degree to which an individual believes that an organization and technical infrastructure exists to support use of the system", supported by the concepts of *perceived behavioral control, facilitating conditions,* and *compatibility* (Venkatesh et al., 2003, p. 453).

These four constructs are analyzed in the UTAUT in relation to "key moderators;" factors that include *age*, *gender*, *experience,* and *voluntariness of use* (Venkatesh et al., 2003, p. 447). Moreover, Venkatesh et al. (2003) noted that attitudes toward using technology, specifically measures of "self-efficacy" and "anxiety" are not "significant determinants of intention," as they are in social cognitive theory, and thus "distinct from effort expectancy" (p. 455). In the context of the current study, this model suggests that county-based ANR Extension professionals, identifying as creators or disseminators of turfgrass information, will display intent towards, and ultimately use of technology, with a focus on the constructs of social influence and facilitating conditions as they relate to the moderating factors.

Methods

The focus of this paper is to share the results of this case study which examined the role of county-based ANR Extension professionals across six states (California, Florida, Georgia, North Carolina, Oklahoma, and Texas), analyzing their role as either creators or disseminators of ANR and turfgrass information, their intent to use social media, and their actual use of these communications to promote engagement with ANR and turfgrass information. A pilot online Qualtrics instrument was developed to measure the intent of researchers and Extension professionals to use social media to disseminate turfgrass information, as well as their use of social media to seek information about turfgrass innovations. The pilot instrument was emailed to turfgrass contacts at six universities in the states identified who were asked to distribute the instrument among their industry contacts to include distribution through the use of social media channels. The instrument was then revised and re-administered through Extension contacts, to a more specified audience: county-based ANR Extension professionals. While the pilot is discussed below, the explanation is done so to set up contextual background of the subsequent study of the revised and implemented instrument.

The Pilot

The research team from the University of Georgia developed and piloted an online instrument to examine differentiation in social media use when disseminating turfgrass information. The pilot instrument consisted of twenty items. Ten of the items were divided among three constructs. Additionally, multivariate and bi-variate demographic questions measuring social influence, facilitating conditions, behavioral intentions, and use behavior of social media. The first construct measured experience/time/use in terms of hours, posts, and years, and consisted of three ordinal items with a response order ranging from 1 to 7, also allowing a text option for responses greater than 7. The second construct measured conditions and consisted of four scale items with a five-option response scale ranging from *strongly disagree* to *strongly agree*. The third construct measured intentions and consisted of three scale items with a five-option response scale ranging from *strongly disagree* to *strongly agree*. These items were adapted from an instrument previously used by Moreno-Ortiz (2018) and were modified to meet the objectives of this study.

A purposive sample was utilized by contacting six land-grant university turfgrass specialists who are part of a multi-state turfgrass grant via email using Dillman's Tailored Design Method (Dillman et al., 2014). The universities were located in California, Florida, Georgia, North Carolina, Oklahoma, and Texas. The specialists were asked to share the instrument among their turfgrass industry contacts through the use of email and social media channels. In accordance with research by Allen et al. (2010), Twitter was the primary mode of contact due to social media channels being specifically requested as the mode for distribution of the instrument due to the specialists' engagement with this channel of communication with the turfgrass industry.

Sampling error was minimized by sharing the instrument through a sample (land-grant university turfgrass specialists) specific to the target audience (those involved in the turfgrass industry), also addressing non-response error by being targeted in the data collection. Coverage error was minimized through the prior contact's use, and industry connectivity, of sharing the instrument on Twitter. A panel of three experts comprised of university professors and researchers ensured translational, face, and content validity. Measurement error was minimized using peer review.

Data were collected over three days in July 2021. The collection period was limited to three days due to the pilot garnishing 23 responses. Nayak and Narayan (2019) noted that "online surveys are cost-effective studies and can be conducted in a short period" (p. 36). Data analysis was conducted with SPSS 28.0 and included determining the reliability within constructs using Cronbach's alpha, detecting the contribution of individual items to the overall reliability using item analysis procedures, and examining demographics using descriptive statistics. Based on reliability analysis of Cronbach's alpha being below a minimum threshold, potentially due to lower number of responses, the authors made the determination to analyze items individually in the subsequent revised study (Nunnally, 1978).

While the pilot instrument was shared with specialists engaged with the turfgrass industry, responses were not limited to a sample as specific as that in the revised study. Moreover, while those who were able to access the pilot instrument were engaged in turfgrass communication, due to manner in which the instrument was shared, the opportunity allowed for individuals outside of Extension to respond. Data analysis of the pilot informed changes to the wording of the future instrument. Therefore, the revised study was informed by the results of the

pilot to allow for an understanding of the role of the county-based Extension professional, leading the objectives of the study to be specified.

Revised Study

The objectives of the study were to:

1. determine the characteristics associated with county-based Extension professionals' use of social media for disseminating turfgrass innovations,
2. determine county-based Extension professionals' intent to use social media to disseminate turfgrass information, and
3. determine the relationship between the identified roles of the county-based Extension professional in relation to social media use

The revised study consisted of nineteen multivariate, bi-variate, and text entry items, adapted from the instrument previously used by Moreno-Ortiz (2018). Results of an item analysis revealed that expanding the number of demographic questions in the instrument to understand use behavior was imperative for analysis. Determining expectations for using social media and the county-level Extension professional's intent to use, as well as current use as it relates to ANR and the turfgrass industry, was collected.

Seven demographic items including county-level Extension position, age, gender identity, racial identity, education level, zip code of their county Extension office, and the sectors of the turfgrass industry they work with were included. Ten contextual items measured social influence, facilitating conditions, behavioral intentions, and use behavior of social media. These included (a) expectation of county-based ANR Extension professionals to use social media by their director/supervisor and clientele; (b) use of social media channels to disseminate ANR information; (c) engagement with social media in terms of years; (d) engagement with social media in terms of posts; (e) role in using social media as it relates to creating verses using; (f) responsibility in disseminating this information; (g) having available resources; (h) having technical knowledge; (i) having content knowledge; (j) predicted use of social media to disseminate ANR information over the next 12 months. Eight of the 10 contextual questions were divided over three "parts" with specified titles in the instrument; the first two contextual items preceded "Part I" and focused on expectations and the channels used for disseminating information.

Part I of the instrument titled *Engagement with Social Media* included two of the 10 contextual items. This part of the instrument measured use behavior of social media and consisted of two ordinal items with a response order ranging from 1 to 5, with a text option for responses greater than 5. In measuring use behavior, questions were limited to measuring years of using social media and the number of posts interacted with each day. Revising the ordinal range to 1 to 5 created bounds on numerical data for consistency. We noted that while an individual may have only been using social media as a tool for communication for a certain number of years, the number of posts engaged with could be more variable. Thus, a text box allowed for expansion of this information.

Part II measured the use behavior of social media by examining the county-based Extension professionals' *Role in Using Social Media* in how they identified themselves as either one who creates ANR information that is disseminated via social media, or one that uses content available to disseminate to clientele. This part of the instrument also measured personal responsibility in crafting and disseminating ANR information via social media. Whereas the first

two parts had a broader focus on the use of social media for disseminating ANR information, the third part of the instrument measured facilitating conditions and behavioral intent specifically related to turfgrass. *Resource Availability and Perceived Knowledge* were examined, and included four items with a 5-point Likert response scale ranging from *strongly disagree* to *strongly agree*, including an option for those to respond "I don't work with turfgrass".

At the conclusion of the instrument, respondents were provided the opportunity to share through two text-based items how understanding the most effective methods for communicating turfgrass innovations could be helpful to them as Extension professionals, as well as space for additional comments regarding their role in ANR and their engagement with social media. Inductive qualitative analysis was used to identify themes through the process of inductive reasoning (Thornberg & Charmaz, 2014). Open and axial coding were used for content analysis (Holton, 2007). Each researcher reviewed the text responses and independently performed content analysis. Emergent themes were compared to ensure consistency in interpretation of the data.

In the first round of data collection, a purposive sample was collected by emailing the Qualtrics instrument link to 22 individuals at various levels of county-level leadership within Cooperative Extension across the six universities associated with the USDA/SCRI turfgrass grant; the universities were located across six states – California, Florida, Georgia, North Carolina, Oklahoma, and Texas. Dillman's (2014) Tailored Design Method was used to increase benefit to and engender trust from participants in order to maximize response rate. In round two of data collection, the instrument was shared via email with 31 Extension specialists across the six states who are specific to the turfgrass industry. These specialists were asked to distribute the instrument to all county-based ANR Extension professionals in their respective states after being informed that the instrument would assist in determining the most effective communication channels for ANR innovations specific to turfgrass.

Sampling and coverage error were minimized by sharing the instrument through contacts in university Extension director, program coordinator, and Extension specialist positions at the land-grant universities associated with the USDA/SCRI turgrass grant. A panel of experts was used to ensure translational, face, and content validity. Measurement error was minimized using peer review. SPSS 28.0 was used for data analysis. Descriptive statistics were used to summarize contextual variables and geometric scoring was used to determine combinations of choices within an item.

Results

Data were analyzed from respondents (n = 111) of the purposive sample of county-based Extension professionals. The results presented are respective to the objectives of the study, based on the UTAUT constructs, in relation to the instrument items. While the contextual items were divided into three parts in the instrument, the data were analyzed descriptively rather than inferentially as constructs.

Beyond the demographic characteristics associated with county-based Extension professionals' use of social media, the characteristics associated with use of social media for disseminating turfgrass innovations were analyzed in relation to social influence with the moderating factor voluntariness of use, measuring expectations of social influence, leading to behavioral intent. Further, we also analyzed facilitating conditions, leading directly to use of social media, in relation to experience (measured by analysis of knowledge).

Demographic Items

Data were collected during both rounds over a twelve-week period from October 6, 2021, through December 9, 2021. A majority (74.50%) of the respondents had a master's degree and identified their race as white (85.60%). Almost two-thirds (64.40%) of the respondents were male, with 34.70% female, and 1.00% selected "prefer not to answer". Respondents, ranging in age from 21 to 69 (M = 44.6, SD = 12.6), were asked to select their role as a county-level Extension professional. From choices selected, and reported, responses included ANR Extension Agent (82.70%), ANR Program assistant (0.90%), ANR Program educator (0.90%), CEC with ANR responsibilities (4.50%), or Other (10.50%). When "Other" was selected, respondents were given a textbox to input their role; responses included Horticulture Extension agent, IPM agent, State Specialist, and Commercial Horticulture agent.

Respondents were able to indicate the sector of the turfgrass industry with which they are involved as an aspect of their job responsibilities, with the option of selecting more than one choice. Over one-third, 37.00% indicated "Personal use (i.e. homeowners)" exclusively. Thirty-two percent indicated being involved in "Turf management and maintenance (i.e. parks, recreational fields, lawn maintenance companies)" and "Personal use (i.e. homeowners)." Twenty-three percent indicated involvement with "Turf production (i.e. sod farms)", "Turf management and maintenance (i.e. parks, rec fields, lawn maintenance companies)", and "Personal use (i.e. homeowners)". No respondent indicated "None of the above" which was also provided as an option.

Determine the Characteristics Associated with County-based Extension Professionals' Use of Social Media for Disseminating Turfgrass Innovations

Social Influence

The expectations of those in authoritative and client positions for county-based Extension professionals to use social media to disseminate turfgrass information were considered a variable for measuring the voluntariness of use of social influence. When asked the level of expectation to use social media to disseminate ANR information the majority of respondents indicated "Sometimes" or "Often" for the expectations of their Director/Supervisor and Clientele, (n = 117, 81.00% and n = 114, 80.40%, respectively).

Facilitating Conditions

The resources and knowledge that are available for county-based Extension professionals to use social media to disseminate information about turfgrass were measured with three items following identification of the sectors of the turfgrass industry they worked with as a part of their job responsibilities. In measuring facilitating conditions, when asked if they had the resources necessary to use social media to disseminate information about turfgrass, 53.80% of respondents (n = 104) indicated "Agree." Facilitating conditions were also measured by determining if technical knowledge and content knowledge were possessed by county-based Extension professionals to disseminate information about turfgrass. Forty-nine percent indicated "Agree" in terms of technical knowledge, and 51.00% specified "Agree" in having the content knowledge of

turfgrass necessary to disseminate information. Respondents were also provided with the opportunity to indicate that they did not work with turfgrass as an answer choice in the three items that were measured. Approximately 2.40% of respondents noted the option "I don't work with turfgrass".

Determine County-based Extension Professionals' Intent to Use Social Media to Disseminate Turfgrass Information

Behavioral Intent

When behavioral intent was measured to use social media for turfgrass information dissemination over the next 12 months, 2.90% of the respondents (n = 104) indicated that they did not work with turfgrass. However, of the county-based Extension professionals that did note their prediction to use social media to disseminate information about turfgrass in the next 12 months, 38.50% indicated "Agree" and 34.60% "Strongly Agree".

It is to be noted that while only one item in the instrument was specifically provided for analysis of behavioral intent, the UTAUT suggests that key constructs, performance expectancy, effort expectancy, and social influence, drive the behavioral intention to use technology (social media in this study). Facilitating conditions, a fourth construct presented in the UTAUT, and analyzed in this study, leads directly to use behavior (as discussed below).

Determine the Relationship Between the Identified Roles of the County-based Extension Professional in Relation to Social Media Use

Use Behavior of Social Media

Facebook was determined to be the social media channel most used by county-based Extension professionals to disseminate ANR information. Ninety-one percent of respondents (n = 102) selected Facebook as a social media channel used for disseminating ANR information. Respondents exclusively noted its use, with 35.50% solely selecting this social media channel for disseminating information. The use of YouTube and Facebook was found to be used by 13.10% of respondents.

The use of social media channels was analyzed in combination with the county-based Extension professional positions (Table 1). ANR Extension agents at the county level reported using Facebook as their primary form of social media. The number of years county-based Extension professionals have been using social media for disseminating information about ANR was measured (M = 9.0, SD = 2.8). Respondents reported interacting with just over two social media posts per day (M = 2.3, SD = 1.5).

Table 1

Extension Professional's Role within the County Office and Use of Social Media Channels

Social Media Channel	ANR Extension agent	ANR program assistant	ANR program educator	CEC with ANR program responsibilities	Other	Total
Facebook	84	1	1	5	10	101
Twitter	19	-	-	-	3	22
Instagram	20	-	1	-	4	25
Pinterest	2	-	-	-	-	2
Snapchat	-	-	-	-	-	-
YouTube	36	-	1	1	5	43
TikTok	2	-	-	-	-	2
Blogs	12	-	-	3	4	19
LinkedIn	5	-	-	-	1	6
Other	9	1	-	-	1	11

Note. Results are presented as *n* number of respondents that reported use of each of the social media channels that were presented as options in the item. - indicates no data was reported.

Respondents reported how they predominately use social media as it relates to ANR; in the instrument, respondents were asked to consider whether they "create" the ANR information that is disseminated on social media or "use" social media content that is already available to disseminate to clientele. An option to select "neither" was also available (Table 2). Analysis of the job roles of the county-level Extension professionals and their identification as creators or users, of the 86 respondents that identified as ANR Extension agents, 43 identified as "creators", 37 as "users", and 6 as "neither". Moreover, respondents also indicated how much of the social media content about ANR that is disseminated is their personal responsibility (Table 3).

Table 2

County-based Extension professionals creating or using content to disseminate via social media

	n	Percentage
Create	54	48.60%
Use	45	40.50%
Neither	6	5.40%
Missing[a]	6	5.40%

[a]Respondents that did not answer this item

Table 3

Personal responsibility associated with disseminating social media content

	n	Percentage
I personally craft and disseminate ALL of the ANR information that is shared via Social Media	50	45.00%
I craft the information and send it to a communications department or third party that then disseminates the information via Social Media	9	8.10%
All Social Media content is crafted and disseminated by a third party and/or a communications department	3	2.70%
All Social Media content is crafted by a third party, but I disseminate it	25	22.50%
None of the above	-	-
Missing[a]	24	21.60%

Note. - indicates no data was reported.
[a]Respondents that did not answer this item.

In determining the use behavior of social media by sector of the turfgrass industry in which the county-based Extension professional is engaged, 54.10% of the respondents (n = 100) who indicated "Personal use (i.e. homeowners)" use Facebook. Twenty-five percent of the respondents involved in "Turf management and maintenance (i.e. parks, rec fields, lawn maintenance companies)" and "Personal use (i.e. homeowners)" indicated using Facebook and YouTube. Similarly, of the respondents involved with "Turf production (i.e. sod farms)", "Turf management and maintenance (i.e. parks, rec fields, lawn maintenance companies)", and "Personal use (i.e. homeowners)", 23.80% indicated using Facebook and YouTube.

Text-based analysis

The first of two text-based items queried if the most effective methods for communicating turfgrass innovations were discovered, how could that assist in their work as

Extension professionals. The second item asked respondents if they would like to share anything additional about their role in ANR and engagement with social media. Two predominant themes were constructed from the responses increase efficiency and increase effectiveness through the flow of communications. Both themes were data-driven and support a more proactive rather than reactive approach to communicating turfgrass innovations and ANR information.

While the word "time" was mentioned repeatedly, several respondents shared that they use social media but are more likely to disseminate up-to-date content created by sources on campus, due to factors such as those expressed in facilitating conditions. “I enjoy creating social media content, but it’s hard to find the time. Having a team that can create quality (and quite frankly, youthful) social media content would save me a lot of time, as it is easier for me to share than content than create it. A more “targeted approach” for sharing communications was suggested for increasing efficiency and would “save time.”

It was further noted that creating communications that are applicable across ANR and the need for up-to-date materials is imperative (as well as someone to create those materials to be disseminated). “I find social media to be a headache. Sharing high-quality materials is much better for me than crafty my own materials to submit. Another respondent shared that they “don’t have time to create much content, but [am] glad to disseminate quality content that is created by a third party.”

Another respondent expressed concerns regarding the content reaching their intended clientele due to client engagement with social media channels. “I use it but I sometimes wonder if all my clientele is receiving it or if it is just bounding around people who already know the content.” This inconsistency was also mentioned by respondents who expressed a need for “more consistency and sharing of resources at the university level.”

Conclusion

The most appropriate source for the creation of information regarding turfgrass innovations, and subsequently those best suited for dissemination, has yet to be established. An initial pilot test demonstrated no significant difference between “creators” and “users” for behavioral intent towards social media use for turfgrass information. Therefore, the focus of this study was to revise the instrument to determine county-based Extension professionals’ intent to use social media to disseminate turfgrass information, the relationship between the identified roles of the county-based Extension professional in relation to social media use, and the characteristics associated with county-based Extension professionals’ use of social media for disseminating turfgrass innovations.

An essential finding of this study is that Facebook is the primary communications channel used by county-based Extension professionals for ANR and the turfgrass industry. The use of Facebook as a primary communications channels used by county-based Extension professions has been well documented in studies (Mains et al., 2013). Additionally, it was determined that the role of the county-based Extension professional to “create” or “use” information to disseminate is not well-defined (Li & Bernoff, 2007). Whereas other studies have analyzed the use of social media channels and the propensity of expectation of Extension professionals to engage in the creation of social media channels for the dissemination of information (Mamgain et al., 2020), a comparative analysis specific to the turfgrass industry had not been examined.

In a qualitative study of the methods for disseminating turfgrass and ANR information currently being used by Extension/Outreach and Communications professionals in Agriculture and Natural Resources, Worley et al. (2022) found that Twitter was the preferred social media channel. Interpersonal communication was still preferred by clientele in receiving information from University Specialists, and University Specialists showed some preference towards "traditional" communication channels such as face-to-face interactions (Worley et al., 2022, p.19). Thus a future recommendation was made for determining the roles of Extension personnel as "creator" and "disseminator". This previous data, and data from this study, show that the roles of "creator" and "disseminator" of communications are not clearly defined among Extension professionals at both the university and county levels; both groups view themselves as both "creators" and "disseminators" of communications.

The characteristics associated with county-based Extension professionals' use of social media for disseminating turfgrass innovations were determined by analyzing the moderating factors of voluntariness of use and experience as they related to the UTAUT constructs of social influence and facilitating conditions (Venkatesh et al., 2003). Whereas 7.8% of respondents reported having a doctoral degree, 73.9% reported having a doctoral degree in data collected from the pilot. Additionally, based on the previous qualitative study by Worley et al. (2022), the use of Twitter is preferred by University Specialists engaged with the turfgrass industry. These findings indicate that education level and one's role within Cooperative Extension affect the social media channels used; Extension professionals located within a county use different social media channels to disseminate ANR and turfgrass information than University Specialists on campus. These findings also resonate with that of Bowman et al. (2018) in the varied importance supervisors or those in authoritative positions place on county-based Extension professionals for social media communication.

County-based Extension professionals' strong intent to use social media to disseminate turfgrass information was determined by measuring behavioral intent through their predication to use social media over the next 12 months. While the relationship between the identified roles of the county-based Extension professional in relation to social media use was determined by measuring use behavior of social media, the use of Facebook among those involved with disseminating information about turfgrass is also consistent with results of the pilot that informed this study (13.1% of pilot respondents indicated using both Facebook and Twitter). Thus, the role of county-based Extension professionals and University Specialists, and their preferred social media channels for communicating information, must be considered and potentially defined as it relates to communications efforts.

Discussion

Facilitating conditions, to include organizational support, were found to be a vital construct to consider in both quantitative and qualitative analysis in relation to the UTAUT. Whereas intent to use social media for disseminating and engaging with ANR and turfgrass information was measured quantitatively in the instrument by asking if the respondents "predict" on using social media in the next year (a measure of behavioral intent, influenced by facilitating conditions), specified reasons (facilitating conditions) for the intent to use social media were uncovered from the qualitative analysis.

When asked how much of the social media content about ANR that is disseminated is their personal responsibility, the term "craft" was used in place of "create"; "create" was used in

the previous question when respondents were asked how they predominately used social media in disseminating ANR information. The intention was to indicate a difference between creating information (knowledge) and crafting social media content (using knowledge-based content that was already created).

The option "none of the above" was not selected when respondents were asked what sector of the turfgrass industry they work with as part of their job responsibilities. However, in the four subsequent questions measuring facilitating conditions, effort expectancy, and behavioral intentions, 2.65% of the respondents indicated they did not work with turf. The potential, therefore, exists that those that initially selected "Personal use (i.e. homeowners)" as the sector of the turfgrass industry with which they are involved may have been referring to their work with homeowners in answering lawn management questions, thus regarding "turf" as meaning all grasses used by homeowners.

Recommendations for Future Research

Garnering a deeper understanding of one's role in disseminating turfgrass information at the county level, beyond their intent to use social media for this communication, is necessary (Venkatesh et al., 2003). Derived from the text-based items in the study, social media content may be disseminated by individuals in various positions within a county Extension office, not just those respondents that took part in the study. However, when asked how much of the social media content about ANR that is disseminated is their "personal responsibility", the data show that more than half of the respondents selected "I personally craft and disseminate ALL of the ANR information that is shared via Social Media". Additionally, because the data show a fairly even division in the number of county-based Extension professionals that predominately consider their role to "create" and to "use" information that is shared via social media, it must be the defined and contextual meaning of these terms as understood by the Extension professionals must be determined. An understanding of if the communications that are used and disseminated to clients are those which were previously created by another source (i.e. a campus-based Specialist) and made available to them is needed. Further research should take place to determine if county-based Extension professionals are simply modifying this pre-existing information to properly integrate the communications for use on social media platforms, or are these individuals creating the knowledge-based information at the county-level that is being shared through these communications channels.

A determination needs to be made from future data collection as to why the communication roles of these two audiences, University Specialists and county-based Extension professionals, are not clearly defined. Analysis of internal and external variables contributing to overlap in the creation of communications materials, and the felt or perceived need to subsequently communicate that information, should take place. For the University Specialist, analysis of the factors contributing to the need to maintain a presence in both roles is warranted. Similarly, for the county-based Extension professional, determining the factors contributing to the need to create communications rather than to solely communicate those that have been created by University Specialists is necessary. Further analysis of this indeterminacy in roles could assess if gaps exist in the creation of communications at the university level, as well as lead to a deeper examination of the expectations placed by administrators on both county and campus-based Extension professionals to create communications. Finally, exploration of a proposed communication model with more clearly defined roles of both county and campus-

based Extension professionals, detailing how they function as “innovators” and “change agents”, could make communicating turfgrass innovations and information more efficient.

Recommendations for Future Practice

With ever decreasing Extension funding and subsequently staff being stretched to do more with less, the need for research-based information to be communicated effectively and efficiently is greater than ever (Prokopy et al., 2015). Results of the study revealed that an increase in efficiency and effectiveness are necessary in order for agricultural innovations in ANR, and those specific to the turfgrass industry, to be communicated. Therefore, creating an established and proactive approach to communicating these innovations, rather than reactively sharing information, could aid county-level Extension professionals in being more efficient and effective in disseminating research-based knowledge to their clientele. Therefore, recommendations for future practice include supervisors and those in authoritative positions to consider the constructs of the UTAUT (performance expectancy, effort expectancy, social influence, and facilitating conditions) when devising a social media communications plan with county-based Extension professionals. This would provide clear directives based on both the community needs as well as those of the county-based Extension professional, especially those working with and in niche ANR fields such as turfgrass. Recommendations also point towards supervisors establishing communications roles within county offices to establish a more effective and efficient dissemination process of information, and moreover, to clarify the ‘other duties as assigned’ that is written into the description for county-based Extension professionals across the country (Androulidakis & Siardos, 1994).

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