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Building Engagement in Facebook: A Case Study with Utah State University Extension Sustainability

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Building Engagement in Facebook: A Case Study with Utah State University Extension Sustainability

Abstract

In order to stay relevant in an online world, Extension must properly use social networking platforms to effectively reach diverse audiences regarding agricultural and natural resource issues. However, few studies have focused on how Extension uses Facebook to effectively accomplish its goal. This study's purpose was to explore how Utah State University Extension Sustainability uses Facebook to engage followers. The researchers conducted a quantitative content analysis of 504 messages posted to the USU Extension Sustainability Facebook page. Graphics and links were the most common post characteristics used by the organization. Text-only posts and posts containing videos were utilized the least. Food was the most common area of sustainability discussed on the page. Posts containing videos, shared content, or that tagged other Facebook pages in messages experienced statistically significantly higher user engagement than posts without those characteristics. Posts containing hashtags experienced statistically significantly lower engagement. Neutral sentiment appeared in the majority of posts. Additionally, information seeking was the most dominant communicative function among the posts. Neither the type of sentiment nor communicative functions were significantly connected to engagement. Future research should determine changes in knowledge, attitudes, intentions, and behavior as a result of exposure to, and engagement with, the Facebook page. Additionally, a qualitative study determining consumers' attitudes toward Facebook content can provide a deeper understanding of the audience's thought processes and content preferences. Page administrators should craft engaging content that builds community among followers.

Keywords

Facebook, engagement, post characteristics, sentiment, communicative functions

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Introduction

Land-grant Extension programs are considered a best-kept secret across the nation (Boyd, 2019; Kelley, 2017), despite serving for over 100 years as a platform for communicating with diverse audiences to create positive change about important agricultural and natural resources issues. In an effort to remain relevant in the 21st century (Bull et al., 2004), Extension professionals are attempting to reach audiences using multiple social media platforms. The advent of social media has created a new stage where communicators can discuss their brand or organization to an audience, previously dominated by big corporations, using two-way communication on available social networking channels (Weinberg, 2009). Facebook is the most popular platform with 69% of U.S. adults using Facebook; three-quarters of those users visit the site at least once a day (Perrin & Anderson, 2019). Previous research indicates an opportunity for Extension to use online technology to reach non-traditional populations (Bowen et al., 2013; Diem et al., 2011). Although Extension professionals are using social media, many are unfamiliar with how to effectively use online social platforms to fulfill an intended purpose (Bowen et al., 2013; Kinsey, 2010). On-going research is needed to determine if Extension professionals are effectively using available tools to reach their desired outcome and what practices are best for communicating science-based information to the public through Facebook.

Utah is recognized as "one of the leading states in the nation for Extension sustainability outreach" (Brain, 2015, p.1). Utah State University Extension Sustainability was created in 2012 to provide "credible information and trainings fostering increased awareness and behavior change to improve environmental, social, and economic conditions" (Brain, 2015; Utah State University Extension Sustainability, 2019, para. 1). As part of this initiative, USU Extension Sustainability operates a Facebook page to help disseminate information to the public regarding the program's five areas of concentration: land, air, food, energy, and water (USU Extension Sustainability, 2019). Administrators post to the page on an almost daily basis, and the page has over 2,700 page likes and over 3,000 followers. Despite its strong social media presence, no research has explored how USU Extension Sustainability uses social media to engage followers. An analysis of the organization's Facebook page's messages provides a needed understanding of Extension social media usage, including types and characteristics of messages that elicit engagement. This information provides Extension professionals with a knowledge of usable tactics to better reach their desired audience.

Communicative Functions

In social media communication, there are three main purposes of organizational messages: information sharing; community-building and dialogue; and promotion and mobilization (Lovejoy & Saxton, 2012; Saxton & Waters, 2014). Information-sharing is the most basic function as it seeks to engage consumers in one-way communication and is the most common function typically found in Facebook messages (King et al., 2016; Saxton & Waters, 2014). The community-building and dialogue function encourages two-way interactivity between the organization and followers and helps provide a sense that audience members should play an active role in sustainability efforts. Promotion and mobilization, the last function, is also one-way in nature and invites followers to assist the organization in some way. Few studies have focused on Extension's social media effectiveness in terms of information sharing, community-building and dialogue, and promotion and mobilization, which are key components to effective

social media communication (Meyer et al., 2017).

Facebook Post Characteristics

Certain post characteristics have been suggested as being influential to increase or decrease Facebook engagement. Engaging with other Facebook pages through post sharing or tagging can create a higher sense of community, which may lead to increased engagement (Bramble, 2018; Oeldorf-Hirsch & Sundar, 2015; Sukhraj, 2017). Engaging with followers can also help facilitate a positive, interactive community (Bortree & Seltzer, 2009; King et al., 2016). The use of a visual element, such as a graphic or video, may be linked with increased engagement, although these are underused tools in social media communication (Chachere & Gibson, 2018; King, 2016; Maresca, 2018; Meyer et al., 2017). Use of embedded links may negatively impact Facebook engagement (Meyer et al., 2017; Repovienė & Pažėraitė, 2018). Hashtags are associated with increased engagement when used sparingly; however, more than three hashtags may lead to decreased engagement (Meyer et al., 2017; Repovienė & Pažėraitė, 2018).

Sentiment

There are three different types of sentiment in Facebook messages: positive, negative, and neutral. Understanding audience sentiment can be crucial when making organizational decisions (Cambria, Schuller, Xia, & Havasi, 2013), and previous studies have recognized a need for sentiment analysis in agriculture and sustainability communication (Meyer et al., 2017; Steede, Meyers, Li, Irlbeck, & Gearhart, 2018).

Engagement

Engagement is a necessary metric to determine the success of Facebook communication (Dawley & Aynsley, 2018; Ken, 2014; Meyer et al., 2017), and can be measured differently depending on the context (Gummerus, 2012). Users can engage by reacting to content, commenting on content, and sharing content (Repovienė & Pažėraitė, 2018). Engagement rate is the total number of post engagements divided by the total reach of a post (Ordioni, 2019; Vora, 2018). An engagement rate of 1 to 2% is considered healthy for many Facebook pages (Ken, 2014), with the average engagement rate for all types of posts being 3.75% (Kemp, 2019).

Theoretical Framework/Conceptual Framework

Uses and gratification theory (UGT) has a long history in mass communication research. Elihu Katz first noted UGT in 1959; however, scholars dispute that the theory's origins are actually rooted in research conducted as early as the 1940s (Maresca, 2018; Ruggiero, 2000). As media has changed, UGT has adapted to encapsulate this shift in audience media consumption, and the theory is prevalent in research regarding audience use of new communication technologies (Dolan, 2015; Dunne et al., 2010; Maresca, 2018; Ruggiero, 2000).

The theory provides a framework for understanding why an audience selectively seeks out media to satisfy a specific need or needs and recognizes the active role of an audience in choosing what media to consume (Dolan, 2015). The development of the internet and social media platforms in recent years makes UGT an increasingly relevant approach by recognizing

social media as a two-way communication process that requires active audience engagement on social platforms (Dolan, 2015; Dunne et al., 2010; Ruggiero, 2000).

Research regarding UGT in relation to the internet has led to a framework involving seven themes: social interaction, information seeking, pass time, entertainment, relaxation, communicatory utility, and convenience utility (Ko et al., 2005; Korgaonkar & Wolin, 1999; Maresca, 2015; Papacharissi & Rubin, 2000; Whiting & Williams, 2013). Five themes were determined by the researchers as relevant to this study: social interaction, information seeking, entertainment, communicatory utility, and convenience utility. First, social interaction is defined as the interactivity aspect of social networking platforms (Ko et al., 2005; Ruggiero, 2000; Whiting & Williams, 2013). The unique nature of social media allows users to engage and communicate with one another through the platform. Papacharissi and Rubin discussed information seeking, the second theme, as the search for knowledge and self-education on the internet. The internet is often a source of entertainment, the next theme, by providing an escape to an enjoyable experience (Korgaonkar & Wolin, 1999; Papacharissi & Rubin, 2000). Communicatory utility is the need of an audience to engage in meaningful communication and information exchange, extending beyond social interaction and information-seeking objectives (Whiting & Williams, 2013). Lastly, convenience utility is the convenience provided by the internet for an audience to fulfill needs (Ko et al., 2005; Papacharissi & Rubin, 2000). Whiting and Williams provided the example of online shopping as a convenience-motivated user interaction. In conjunction with the concept of social media marketing, UGT is an ideal framework to determine what types of messages fulfill needs as indicated by engagement on social media platforms.

Social media research involving agricultural topics has found UGT a fitting framework to analyze audience motivations in pursuing various types of online messages, allowing users to tailor content to best fit the needs of an audience (Beattie et al., 2019; Maresca, 2018; Meyers et al., 2015; Meyers et al., 2011). Users come to social media for a purpose and seek content to fill their desired needs (Gummerus, 2012). Facebook users use the platform to fulfill the five needs related to UGT: social interaction, information seeking, entertainment, communicatory utility, and convenience utility (Gummerus, 2012; Whiting & Williams, 2013). Out of these top five themes, social interaction and information seeking are the most prevalent uses (Whiting & Williams, 2013).

First, Facebook is a social platform, and many users seek social interaction (Whiting & Williams, 2013). Whiting and Williams determined that 88% of Facebook users come to the platform seeking social interaction, and use Facebook "to connect and keep in touch with family and friends, interact with people they do not regularly see, chat with old acquaintances, and meet new friends" (p. 366). Additionally, social interaction factors are important in attracting new visitors to a page, and organizations should offer social opportunities for followers to interact (Gummerus, 2012).

Facebook users also use the platform to seek information (Hughes et al., 2011). Differing from traditional methods of information seeking, Facebook users tend to seek out information through social methods, such as posting a question to be answered by fellow members (Hughes et al., 2011). Gummerus (2012) found that while users actively seek out information on a page, they passively engage with the material by preferring to read the information rather than participate in the discussion. About 80% of social media users use the platforms to seek information on events, how-to instructions, etc., although this statistic is not specific to Facebook (Whiting & Williams, 2013).

Entertainment, communicatory utility, and convenience utility are the final three themes of Facebook uses. Entertainment should be a focus of some messages as it may entice users to visit more frequently (Gummerus, 2012). On the site, entertainment comes in many forms such as playing games or watching videos (Whiting & Williams, 2013). Whiting and Williams found that users enjoyed using Facebook because it provided conversation pieces for their social circle as they discussed recent updates and life events they viewed on the platform, thus fulfilling the need of communicatory utility. Lastly, the free, ever-present, and easily accessible nature of the platform provides convenience utility to consumers (Whiting & Williams, 2013). However, this is one of the lowest ranked reasons people use social media platforms (Meyers et al., 2015).

A conceptual model was created to explore USU Extension Sustainability's use of Facebook to engage followers (Figure 1). This model was developed by reviewing existing literature related to organizations' communicative functions of Facebook messages, post characteristics, sentiment, and the audience's uses of Facebook.

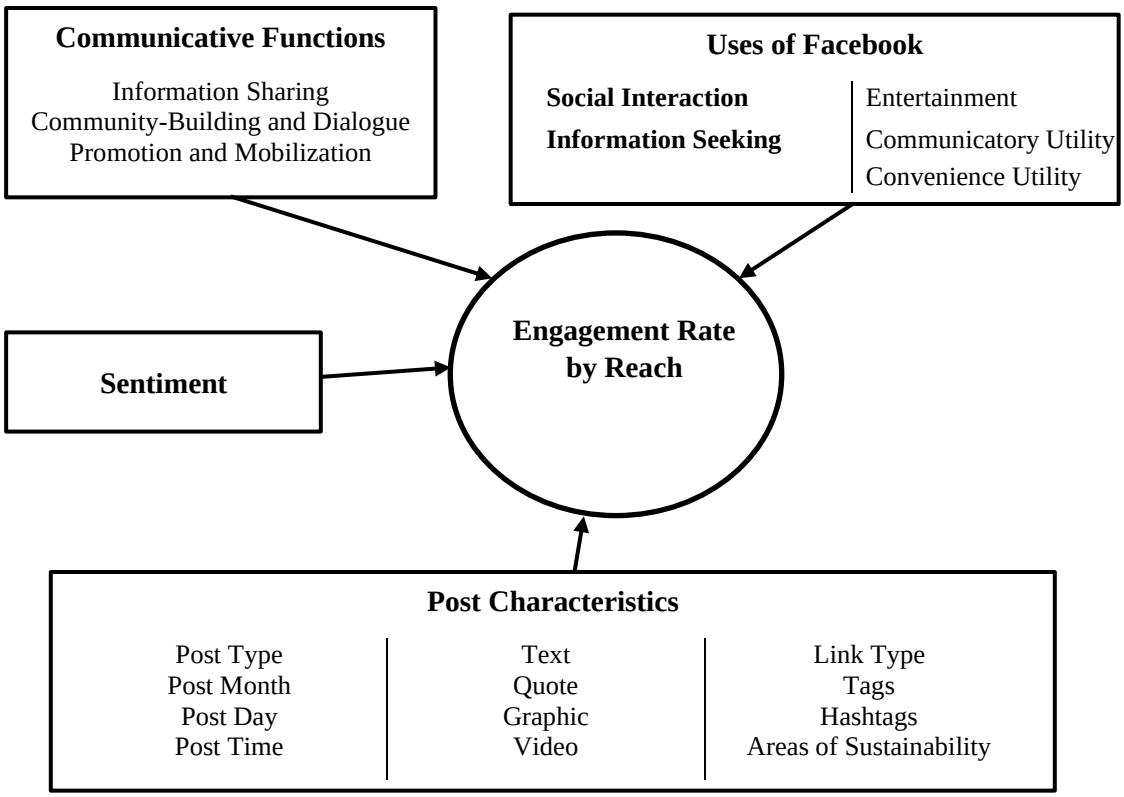

Figure 1. Conceptual Model of Components that Influence Engagement Rate by Reach

Purpose & Research Questions

The purpose of this study was to explore USU Extension Sustainability's use of Facebook to engage followers. The study was guided by the following research questions:

1. What characteristics were present in individual posts?

2. What differences exist between individual post characteristics and Facebook engagement rate?
3. What are the differences between the communicative functions and Facebook engagement rate?
4. What are the differences between the types of sentiment and Facebook engagement rate?

Methods

This study used a quantitative content analysis of posts on the USU Extension Sustainability Facebook page, which is a powerful and well-established tool for analyzing Facebook messages (Krippendorf, 2003; Neuendorf, 2016). Facebook posts (n = 504) since September 4, 2017, on the USU Extension Sustainability Facebook page were selected because Facebook Insights started tracking individual and page data on that date. Messages posted after September 1, 2019, were not included in this study. Individual Facebook posts were the unit of analysis (Reichenbach, 2014).

A codebook and codesheet were developed to compile Facebook post data, based on the research by Chachere and Gibson (2018), King (2016), Maresca (2018), Meyer et al. (2017), and Saxton and Waters (2014). The codebook was divided into three independent variables that are based on the conceptual model for the study: post characteristics, communicative functions, and sentiment. Although posts may contain more than one function, coders categorized messages by the primary function in the post (Hallsten, 2019; Lovejoy & Saxton, 2012). These independent variables may affect the level of engagement on the post.

Post characteristics included post month, post day, post time, text, graphic, video, quote, link, location tag, and hashtag use. The post month was the month in which the post was published. Post day was the day of the week that the post was published to the Facebook timeline. The time the post was published was coded as either AM or PM. The text variable determined whether or not the post only included text and no other variables within the post. The variables of graphic, video, and quote recorded whether each of those variables were present in the post. The link variable determined if a link to an internal (university-related) or external site, or both, was present in the post. Posts that tagged a specific location in the text or header of the post were accounted for in the location tag variable. The hashtag variable determined if hashtags were present in the post. If so, coders recorded the number of hashtags and which hashtags were used. Hashtags were considered popular if used six or more times.

The communicative functions were the information seeking, community-building and dialogue, and promotion and mobilization functions. The information function included any post that exhibited a purely information message with no attempt to foster community, start a dialogue, or spur further action other than to learn more about a topic. The community function included posts where the main message purpose was to start conversations by questions or prompts, create a tighter community through celebration of accomplishments, recognition of members, and more. Messages demonstrating the promotion and mobilization function included posts which aimed to promote some sort of action for the betterment of the organization. This included job postings, suggesting followers adopt specific sustainable behaviors, etc.

The sentiment of Facebook posts was coded as positive, neutral, or negative. Posts were positive if the messages portrayed an overall uplifting or upbeat attitude about the topic or entities included in the post. Neutral posts were posts which displayed neither a positive nor

negative sentiment. Negative posts connoted an overall feel of displeasure or negativity about the topic or entities discussed in the post. This may occur in posts that discuss non-sustainability organizations, events, or other activities.

Engagement rate by reach, the dependent variable, is a formula that divides the number of engaged users by the total reach of each post (Ordioni, 2019; Vora, 2018). The score is multiplied by 100 to report a percentage (Sehl, 2019). Engagement on Facebook is the number of reactions, shares, comments, as well as clicks on links, videos, and images. Total reach is the total number of individuals who saw the post on their Facebook feed.

A panel of five experts reviewed the codebook to determine face validity. The lead researcher trained two coders to use the codebook and codesheet. Following the training session, the coders independently coded 10% of the Facebook posts (n = 56) on the USU Extension Sustainability Facebook page, which were randomly selected (Lombard et al., 2010; Lovejoy et al., 2014; Wimmer & Dominick, 2003). Facebook posts included in the pilot test were not included in the final analysis. A retraining helped clarify the communicative functions and link types. Coders were retrained to determine one dominant communicative function as many posts contained a mix of functions. An agreement of 0.8 for Krippendorff's alpha was preferable (Denzin & Lincoln, 2011; Krippendorff, 2004). Krippendorff's alpha levels ranged from .76 to 1.0, which were acceptable levels. Percentage agreement was used to determine reliability for nominal-level variables where there was insufficient variability to accurately conduct a Krippendorff's alpha (Krippendorff, 2004; Krippendorff, 2011). These variables included post type, video inclusion, location tag, page mention, and sentiment. Percentage agreement ranged from 85.7 to 98.2. The remaining Facebook posts (n = 504) were randomly divided and assigned to each coder.

This study used Facebook Insights and human coding for data collection. Facebook Insights, a free analytics tool provided by Facebook, provides information about the total post reach, engaged users, and engagement rate. Human coders coded the independent variables. Sentiment is better analyzed by humans as they are more equipped to comprehend and evaluate the context and verbiage evident in the message (Riffe et al., 2014; Steede et al., 2018). Additionally, Facebook Insights does not code for communicative functions. The data were analyzed in SPSS version 24.

Results

RQ 1: What characteristics were present in individual posts?

Post characteristics included in the study were post type, post month, post day, post time; the inclusion of a quote, graphic, video, and text; and link type, tags, and hashtags. Out of 504 posts, 12.3% (n = 62) were published in March, which was the highest percentage published in one month. September and December had the least number of posts (n = 26, 5.2%). The majority of posts were published in the morning (n = 343, 68.1%), with Tuesday and Thursday having the most posts (n = 95, 18.8%) and Sunday posting the least (n = 21, 4.2%). Almost all posts were created by USU Extension Sustainability (n = 462, 91.7%). Few posts mentioned a Facebook page separate from USU Extension Sustainability (n = 62, 12.3%). A link was the most common post characteristic with 62.9% (n = 317) containing an internal or external link, or both, followed by the use of a graphic (n = 256, 50.8%). Videos were included in 24 posts (2.8%). Text-only posts were the least common (n = 3, 0.6%) followed by the use of a location tag (n = 4, 0.8%).

Table 1 depicts the frequency of post characteristics on the page.

Table 1

Frequencies of Post Characteristics of the USU Extension Sustainability Facebook Page

Variable	*N*	%
Post month		
January	41	8.1
February	49	9.7
March	62	12.3
April	60	11.9
May	56	11.1
June	45	8.9
July	39	7.7
August	23	4.6
September	26	5.2
October	42	8.3
November	35	6.9
December	26	5.2
Post time		
Morning	343	68.1
Afternoon	161	31.9
Post day		
Monday	89	17.7
Tuesday	95	18.8
Wednesday	84	16.7
Thursday	95	18.8
Friday	93	18.5
Saturday	27	5.4
Sunday	21	4.2
Post Type		
Original	462	91.7
Shared	42	8.3
Graphic		
Yes	256	50.8
No	248	49.2
Text only		
Yes	3	0.6
No	501	99.4
Video		
Yes	24	2.8
No	480	95.2

(table continues)

Variable	*N*	%
Quote		
Yes	70	13.9
No	434	86.1
Link		
No link present	187	37.1
Link to internal site	71	14.1
Link to external site	241	47.8
Link to both internal & external site	5	1.0
Location tag		
Yes	4	0.8
No	332	65.9
Page mention		
Yes	62	12.3
No	442	87.7
Hashtags		
Yes	172	34.1
No	332	65.9
Areas of sustainability		
Not applicable	42	8.3
Not identifiable	91	18.1
Land	102	20.2
Water	24	4.8
Air quality & climate change	62	12.3
Food	164	32.5
Energy	19	3.8

Approximately a third of posts used hashtags (*n* = 172, 34.1%). The number of hashtags included in the post ranged from none (*n* = 332, 65.9 %) to eight (*n* = 1, 0.2%). Hashtags were considered popular if they appeared six or more times in the Facebook posts during the study's time period: #sustainability (*n* = 94, 18.7%), #gardening (including #garden and #gardens, *n* = 20, 4.0%), #recycle (including #recycling, *n* = 14, 2.8%), #Utah (*n* = 14, 2.8%), #permaculture (*n* = 14, 2.8%), #earth (*n* = 11, 2.2%), #cleanair (n = 9, 1.8%), #usu (*n* = 8, 1.6%), #climatechange (*n* = 8, 1.6%), #meatlessmonday (*n* = 6, 1.2%), and #water (*n* = 6, 1.2%).

RQ 2: What are the differences between individual post characteristics and Facebook engagement rate?

A series of independent-samples *t* tests determined if differences exist in engagement rate by reach between specific post characteristics: post time, post type, graphic, video, quote, page mention, and hashtags. The group sizes for the post characteristic variables were not equal group sizes, and Field (2013) recommends ignoring Levene's test and reading results from the SPSS data output row labeled equal variances not assumed. Effect sizes determined what practical

effect the post characteristics had on the engagement rate by reach. The effect size was calculated per Hedges's *g* procedure because the groups for the post characteristic variables had different sample sizes (Rosenthal & Rosnow, 2008). Hedges's *g* is compared to the three benchmark standards presented by Cohen (1988): small effect size (*d* = .20), medium effect size (*d* = .50), and large effect size (*d* = .80).

No differences existed in engagement rate by reach between posts published in the morning or afternoon. Facebook posts had similar engagement rate by reach for AM publication (*M* = 2.08, *SD* = 0.62) and PM publication (*M* = 2.10, *SD* = 0.77), a non-statistically significant difference, *M* = -0.02, 95% CI [-0.15, 0.12], t(262.08) = -.25, *p* = .803. An effect size of 0.03 was determined. Next, an independent-samples *t* test determined if differences exist in engagement between the type (original or shared) of the Facebook post. The Facebook posts had slightly higher engagement rate by reach for shared posts (*M* = 2.58, *SD* = 0.72) than original posts (*M* = 2.04, *SD* = 0.65), a statistically significant difference, *M* = 0.54, 95% CI [0.31, 0.78], t(47.16) = 4.71, *p* = .000. Further, the effect size was large (Hedges's *g* = 0.82). An independent-samples *t* test determined that the Facebook posts had similar, but slightly higher engagement rate by reach for posts containing a graphic (*M* = 2.14, *SD* = 0.64) and posts without (*M* = 2.03, *SD* = 0.70), a non-statistically significant difference, *M* = -0.11, 95% CI [- 0.23, 0.01], t(495.35) = -1.87, *p* = .062. This result had a 0.16 effect size.

There was a statistically significant difference in the engagement rate by reach for posts containing a video (*M* = 2.67, *SD* = 0.84) and posts without (*M* = 2.05, *SD* = 0.65), *M* = -0.62, 95% CI [-0.97, -0.26], t(24.41) = -3.57, *p* = .002. Further, the effect size was large (Hedges's *g* = 0.94). There was a non-statistically significant difference in engagement rate by reach for posts containing a quote (*M* = 2.05, *SD* = 0.59) and posts without (*M* = 2.09, *SD* = 0.68), *M* = 0.04, 95% CI [-0.11, -0. 20], t(101.67) = 0.54, *p* = .593. Further, the effect size was 0.06.

An independent-samples *t* test determined if there were differences in engagement between Facebook posts containing a page mention and posts without. The Facebook posts had slightly higher engagement rate by reach for posts containing a page mention (*M* = 2.36, *SD* = 0.74) and posts without (*M* = 2.05, *SD* = 0.65), a statistically significant difference, *M* = -0.31, 95% CI [-0.51, -0.12], t(75.05) = -3.17, *p* = .002. This result had a medium effect size (Hedges's *g* = 0.47). Next, Facebook posts had slightly lower engagement rate by reach for posts containing a hashtag (*M* = 1.98, *SD* = 0.69) compared to posts without (*M* = 2.14, *SD* = 0.66), a statistically significant difference, *M* = 0.15, 95% CI [0.03, 0.28], t(331.22) = 2.43, *p* = .016. Further, this result had a small effect size (Hedges's *g* = 0.24).

A Kruskal-Wallis H test revealed a statistically significant difference in engagement rate by reach between posts with a link to an external site (*Mdn* = 3.81) and posts where no link was present (*Mdn* = 4.47), *p* = .001. Median scores for engagement rate by reach were statistically significant among the link variables, H(3) = 15.20, *p* = .002. Subsequently, pairwise comparisons were performed, and a Bonferonni correction was conducted for multiple comparisons. Adjusted p-values are presented. There was no significant difference between engagement rate by reach and posts containing links to internal sites (*Mdn*= 4.63) or posts containing a link to both an internal and external site (*Mdn* = 4.21) or any other group combination. Table 2 indicates which post characteristics were statistically significant.

Table 2

Statistical Significance of Differences in Engagement for Post Characteristics on the USU Extension Sustainability Facebook Page

Significant Characteristics	Non-Significant Characteristics
Post Type	Post Month
Post Day	Post Time
Video	Text
External Link	Quote
Hashtag	Graphic
Page Mention	Other Link Types
	Communicative Functions
	Sentiment

A Kruskal-Wallis H test assessed whether a difference exists between the days the messages were posted to the timeline and engagement rate by reach. Median scores for engagement rate by reach were statistically significant among the post days, H(6) = 14.55, p = .024. A pairwise comparison and Bonferonni correction was then completed for multiple comparisons, and adjusted p-values are presented. The Bonferonni correction revealed a statistically significant difference in engagement rate by reach scores between posts that were published on a Tuesday (*Mdn* = 3.63) and posts that were published on a Friday (*Mdn* = 4.65), p = .010. According to the pairwise comparison, posts published on a Tuesday experienced slightly lower engagement rate than posts published on a Friday. No significant difference was detected among any other group comparisons.

RQ 3: What are the differences between the communicative functions and Facebook engagement rate?

The frequency and percent of each communicative function were reported: information sharing (n = 231, 45.8%), promotion and mobilization (n = 171, 33.9), and community-building and dialogue (n = 102, 20.2%). The Kruskal-Wallis H test determined if there were differences in engagement rate by reach between the three communicative functions. Median scores for engagement rate by reach increased from promotion and mobilization (3.85), to community-building and dialogue (4.09), to information sharing (4.21) communication messages, but the differences were not statistically different between groups, H(2) = 4.41, p = .110.

RQ 4: What are the differences between the types of sentiment and Facebook engagement rate?

Out of 504 total posts, 21% (n = 106) of posts contained positive sentiment, 78.6% (n =396) posts were neutral, and 0.4% (n = 2) posts included negative sentiment. Due to the small number of Facebook posts portraying negative sentiment, this category was not included in the analysis.

An independent-samples *t* test indicated no significant difference between positive sentiment in posts (M = 5.20, SD = 3.14) compared to negative sentiment in posts (M = 4.69, SD = 3.40), M = 0.51, 95% CI [-0.18, -0.21], t(176.60) = 1.46, p =.21. The effect size of Hedges's g was 0.15.

Discussion/Conclusions/Recommendations

Facebook followers use the platform and engage with the USU Extension Sustainability page to gratify certain needs through their behavior. Their behavior may be influenced by the characteristics in the posts depending on how well those characteristics gratify the audience's desired uses and needs (Dolan, 2015; Maresca, 2018).

The USU Extension Sustainability page could post more consistently throughout the year. The page posted much more frequently in the spring, which may be due to several sustainability-themed holidays, such as Earth Day. Some months experienced over 60 posts, equating to over two posts a day in some cases. Extension social media administrators should consider using a posting schedular or calendar to ensure that posts are consistent throughout the year.

The originality of the post, whether the post was created by USU Extension Sustainability or shared from another Facebook page, had a statistically significant relationship with engagement rate by reach. Shared posts experienced slightly higher engagement than USU Extension Sustainability's original posts. While there is a dearth of research focusing on the influence of shared content, this finding supports previous literature stating that an organization must post meaningful content targeted toward a specific audience (Maresca, 2018; Meyers et al., 2011). Additionally, shared content may promote a sense of community possibly leading to increased engagement (Bramble, 2019; Sukhraj, 2017). The USU Extension Sustainability Facebook page almost always posted original content to the page. Posting original content allows the organization to tailor content to the specific needs and desires of the audience, gratifying their use of the platform (Newberry, 2018; Sprout Social, n.d.; Weinberg, 2009). However, sharing posts can also fulfill needs if material is relevant and may foster a sense of community, thus fulfilling the social interaction use of Facebook according to UGT (Smith, 2017; Whiting & Williams, 2013). Extension Facebook page administrators can follow pages with similar content and share posts relevant to the organization's target audience, thus improving the overall sense of community on the page.

Previous research indicated that tagging other pages by mentioning those pages in the message of the post may increase engagement (Oeldorf-Hirsch, & Sundar, 2015). This study confirmed these suggestions as posts containing page mentions had higher Facebook engagement. Tagging other pages relates to the community-building purpose of Facebook, which may favor the post in the algorithm (Mosseri, 2018). Tagging also allows for social interaction, thus perhaps gratifying the need of the social media audience according to UGT (Whiting & Williams, 2013). Additionally, tagging other pages causes the post to appear on both the original organization's page and the page of the organization or person mentioned in the post. This provides further reach and allows for greater chance of engagement.

The use of digital media may also affect user engagement. There was a statistically significant relationship between the use of a video and post engagement rate by reach, despite its infrequent use by the organization. This is in line with Bortree and Seltzer (2009) who indicated that video is a poorly underestimated and underused resource to drive audience engagement. Additional literature indicated that using a video provides a post a greater chance for heightened engagement (Barnhart, 2018; Newberry, 2018; Repovienė & Pažėraitė, 2018). Entertainment is a

theme indicated in UGT for a social media audience, and followers may seek to fulfill that need through consumption of digital media (Whiting & Williams, 2013). The Facebook page does post graphics regularly, which are also an effective engagement driver as suggested by social media marketing literature (Meyer et al., 2017).

Very little information was available about the use of location tags in posts (Maresca, 2018; Repovienė & Pažėraitė, 2018). The USU Extension Sustainability Facebook page used this feature in less than 1% of posts, which may be a result of lack of knowledge of the feature or little desire to deviate from the traditional Facebook posting routine. Additionally, content is managed with the help of undergraduate students who post content retrospectively or are not present at the actual location and post content provided by other sources, and therefore do not tag the location (R. Brain McCann, personal communication, December 13, 2019).

The number of hashtags may affect the user engagement with a post. Posts not containing hashtags experienced a slightly higher engagement rate by reach, which is inconsistent with previous findings indicating that hashtags can help drive engagement (Kissane, 2015). However, Ayres (n.d.) found that the higher number of hashtags may negatively impact engagement, which is consistent with this finding. Repovienė and Pažėraitė (2018) found that the number of hashtags was associated with positive engagement. Meyer et al. (2017) did not discover a significant relationship between the use of hashtags and engagement; however, the authors did discover that more than two hashtags tended to decrease engagement on the post. Posts that did include hashtags included anywhere from one to eight hashtags, with three being the most common number of hashtags. The higher number of hashtags in USU Extension Sustainability's posts may play a role in the decreased engagement experienced by these posts. Additionally, the majority of posts (n =332) did not contain a hashtag. Such a large number may have impacted the findings. Furthermore, variation in the use and number of hashtags ranged in the literature depending on the type of page and manager preferences. Maresca (2018) and Meyer et al. (2017) discovered the Facebook pages used branded hashtags to tie together one central idea. The USU Extension Sustainability Facebook page used some hashtags consistently such as #sustainability or #usu but did not use a branded hashtag specific to the organization. This may indicate a branding issue if USU Extension administrators desire a unified voice for the overarching USU Extension organization on online media.

Meyer et al. (2017) and Repovienė and Pažėraitė (2018) determined that posts containing links typically experienced decreased engagement. In accordance with these findings, this study found that posts containing external links had statistically significantly less Facebook engagement than posts without links. The use of internal links in Facebook posts neither hindered nor aided engagement in a statistically significant way. Including external links may drive followers to other community organizations and create a sense of an overall goal of sustainability, regardless of the institution providing the information. Links may also vary in popularity with followers depending on the need they fulfill for the audience (Dolan, 2015). As information seeking is a key theme of UGT, perhaps only links that provide relevant information to an audience elicit engagement (Whiting & Williams, 2013).

Along with post characteristic, the communicative function dominant in a message may also impact post engagement. According to UGT, an audience uses social media for specific purposes (Whiting & Williams, 2013). Conversely, an organization sends media messages that achieve one of three communicative functions for the audience. Understanding which communicative functions were used and the relationship between each communicative function and engagement rate by reach can provide valuable insight about an audience's uses and

gratification from a Facebook page and individual posts. In this study, information seeking was the most common purpose of Facebook posts on the USU Extension Sustainability Facebook page. This is in accordance with the top uses of new, or social, media by an audience according to UGT (Whiting & Williams, 2013). Additionally, information seeking was the most commonly used function by non-profit organizations in previous literature (Saxton & Waters, 2014). While important for information transfer, this function is the least engaging function (Lovejoy & Saxton, 2012). Promotion and mobilization is the second most common function, and community-building and dialogue is the least used function. While unsurprising based off similar results (King et al., 2016; Saxton & Waters, 2014), this finding indicates a disconnect between the purpose of Facebook and actual posting practices by an organization. However, Extension strives to provide research-backed information to an audience, which may affect the presence of communicative functions in posts on this, and other, Extension pages.

The community-building and dialogue function encourages engagement by followers and fulfills the purpose behind Facebook, aiding in the overall placing of the post by the Facebook algorithm that helps posts travel further to diverse and expanding audiences (Mosseri, 2018). Previous findings indicate that among the three functions, community-building and dialogue has the highest chance of eliciting engagement (King et al., 2016; Meyer et al., 2017), thus fulfilling the two-way interactivity purpose of social media. This also aligns with previous UGT research which states that social interaction is one of the top two themes sought after by social media audiences (Whiting & Williams, 2013). However, this study determined there was not a statistically significant relationship among functions in relation to engagement rate. This finding suggests that the communicative function present in each post does not aid or discourage Facebook engagement for USU Extension Sustainability.

The goal of the USU Extension Sustainability Facebook page is to provide "empowering, positive, beautiful and easy messaging to improve our environmental footprint" (R. Brain McCann, personal communication, July 2, 2019). Analyzing sentiment can help page administrators determine if the goal of the page is being met and provide insight into the overall attitude and tone portrayed by page administrators. Additionally, it may indicate the level of communicatory utility on a topic, indicating whether the page is gratifying that UGT theme among its audience (Whiting & Williams, 2013). Findings determined the majority of posts portrayed neutral sentiment, followed by positive sentiment. Negative sentiment was rarely detected in the posts. This suggests that, overall, posts are meeting the page's goal which supports a need to discuss similar issues in a positive, uplifting manner (Steede et al., 2018). The goal of the Facebook page should be set by Extension administrators and collaborators, and then routinely monitored for successful implementation.

No statistically significant differences were found among the different types of sentiment and Facebook engagement. Few research studies are available concerning sentiment in sustainability communication, so this was a new finding. Other literature evaluating sentiment in social media communication focused on controversial areas, such as antibiotic use in livestock (Steede et al., 2018). Results regarding sentiment may be impacted by the small number of negative posts published by USU Extension Sustainability. However, the organization is part of an educational institution and should be professional in representing the university at all times. Negative sentiment may cause conflict among members or stakeholders of the organization, which would fail to improve the community atmosphere of the page and may be detrimental to USU Extension Sustainability. Extension Facebook administrators should consider this aspect when determining the sentiment of posted content.

Recommendations for Research

Researchers should examine Facebook engagement in other Extension Facebook pages and compare results to this study. These studies should also test and modify the conceptual model put forth in this study. Additionally, other variables in relation to engagement should be considered in future studies such as a specific range of times during the day when posts are published, the inclusion of emojis and the frequency of emoji use, organizational response, and the differences between organic and paid posts. Future research should further the conceptual model by focusing on different dependent variables to measure engagement, such as the number of likes, comments, and shares on a post to provide a clearer understanding of what engagement was experienced on individual posts. Examining followers' comments on the page may provide important insights about the community atmosphere of the page and provide detailed information regarding follower attitude toward certain topics and the overall USU Extension Sustainability organization. Additions to this study should include a qualitative approach to determine audiences' attitudes and opinions of content and posts which have experienced higher engagement on the Facebook page. This can provide a deeper, richer understanding of an audience's thought processes and reactions to posts, and may also identify significant variables not included as part of this study. The further exploration of how Facebook can be used as an educational tool should be conducted. Lastly, as social media is ever shifting, this research should be adapted to study other upcoming social media and online channels, such as Instagram and websites, in order to stay relevant.

Recommendations for Practice

The USU Extension Sustainability Facebook page should implement the following changes. First, page managers should seek to post and share relevant digital media, specifically video, on their respective pages. Furthermore, they should seek to use Facebook Live to drive engagement and interact with page followers in real-time. With the assistance of scheduling software, page managers may post to the page once or twice a day - on weekdays - throughout the year, tying into relevant holidays when possible. Administrators of the page need to set SMART goals and evaluate metrics to ensure progress through Facebook communication. Facebook administrators of Extension pages should consider incorporating branded hashtags in their communications; however, no more than two should be included in a post. Administrators of Extension Facebook pages may seek to train any additional Facebook editors and managers on the use of location tags when posting. However, the research does not indicate that this will affect user engagement.

Lastly, page managers and administrators should seek to build community through the use of characteristics and communicative functions to encourage dialogue and two-way interactivity between the organization and its followers. Additionally, Extension Facebook page administrators can follow related pages and share relevant content posted by the pages. These minor adjustments may help the organization improve its communication with its target audience. Overall, the organization is doing an excellent job of engaging followers on sustainability-related topics using the platform.

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