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

by

Kenna Kesler

A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Agricultural Extension & Education

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UTAH STATE UNIVERSITY
Logan, Utah
2020
ABSTRACT

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

by

Kenna Kesler, Master of Science

Utah State University, 2020

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Extension programs must learn how to effectively use social media to reach diverse audiences in order to stay relevant. However, little research has explored the effectiveness of Facebook use in terms of audience engagement. The purpose of this study was to explore how Utah State University (USU) Extension Sustainability uses Facebook to engage followers.

This study used human coders and Facebook Insights to conduct a quantitative content analysis of existing public Facebook posts (n = 504) on the USU Extension Sustainability Facebook page to determine how post characteristics, sentiment, and communicative functions may impact engagement. Uses and gratification theory and social media marketing guided the framework for this study, and a conceptual model depicted the relationship between the specified variables and engagement rate by reach.

The research questions guiding this study include: (1) what characteristics were present in
individual posts? (2) what are the differences between individual post characteristics and Facebook engagement rate? (3) what are the differences between the communicative functions and Facebook engagement rate? and (4) what are the differences between the types of sentiment and Facebook engagement rate?

The most popular post characteristics used by the organization were a graphic and a link; food was the most discussed area of sustainability. Almost all posts were original content, and most posts were published in the morning. Video was underutilized, despite posts containing this characteristic having significantly higher engagement. Posts that mentioned or shared content from other Facebook pages also experienced significantly higher engagement. Posts containing hashtags experienced significantly lower engagement. Most posts portrayed a neutral sentiment and information seeking was the most common communicative function; neither characteristic was significantly related to engagement. These findings can help administrators create a marketing plan to drive engagement in order to reach the goals of the organization.

Future research should include additional variables in relation to engagement. Studies 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 audiences’ thought processes and content preferences.
PUBLIC ABSTRACT

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

Kenna Kesler

The purpose of this study was to explore how Utah State University (USU) Extension Sustainability uses Facebook to engage followers. The researcher 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. Text-only posts and posts containing videos were used the least. Food was the most common area of sustainability discussed on the page. Posts containing videos, shared content, or that tagged other pages in Facebook 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 audiences’ thought processes and content preferences.
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Kenna Kesler
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CHAPTER I
INTRODUCTION

Land-grant Extension programs are considered a best-kept secret across the nation (R. Boyd, 2019; Burns, 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, including sustainability. Professionals in these programs use research-based information to educate the public and promote practical application of this information (National Institute of Food and Agriculture, n.d.). In an effort to remain relevant in the 21st century (Bull, Cote, Warner, & Mckinnie, 2004), Extension professionals are reaching diverse audiences in different ways than traditional methods using multiple social media platforms (i.e., Facebook, Instagram, Pinterest, YouTube, Twitter). Facebook is the most popular social media 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). Extension programs have created Facebook pages or groups specific to their subject areas, and interested followers can view and interact with these pages through likes and other reactions, comments, shares, messages, and views (Mains, Jenkins-Howard, & Stephenson, 2013). Thus, Facebook is a powerful Extension tool (Cornelisse et al., 2011; Gharis, Bardon, Evans, Hubbard, & Taylor, 2014; Kinsey, 2010) although the site has not been used as a major avenue for Extension outreach (Newbury, Humphreys, & Fuess, 2014).

As Extension’s relevancy is called into question (Bull et al., 2004), public interest in the agriculture industry in the U.S. has grown as is shown by the increased number of
food-related education programs, involvement in the local food movement, food marketing strategies, blogs, movies, publications, and social media posts (Pingali, 2010; Todd, 2014). Consumers are increasingly concerned about how food manufacturing and different agricultural production practices connect to their personal health, the economy, and the environment (U.S. Farmers and Ranchers Alliance, 2011; Yadavalli & Jones, 2014). The complex issues of agricultural production, space (i.e., farm land preservation, food production, and urban sprawl), natural resource management, energy consumption, climate change, air quality, and water use offer opportunities to communicate among farmers, ranchers, policymakers, and the American public (C. S. Boyd & Svejcar, 2009; Brown, 2012; Emmott, 2013; Stedman & Andenoro, 2015). Consumers and policymakers need accurate information about these complex issues, helping them to articulate their decisions and understand how agriculture is important to their quality of life (Kovar & Ball, 2013; Spielmaker & Leising, 2013).

Utah State University (USU) 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; USU Extension Sustainability, 2019a, 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, 2019b). Administrators post to the page on an almost daily basis, and the page has over 2,700 page likes and over 3,000 followers. In comparison with 50 other university Facebook pages (i.e., athletics, academic programs,
clubs, Extension pages, university main page), USU Extension Sustainability ranked fifth overall in page likes at USU in early 2016 (R. Brain McCann, personal communication, July 2, 2019).

**Statement of the Problem**

In order to fulfill its part of the land-grant mission, Extension needs to adopt and effectively apply communication tools and programs. Previous research indicates an opportunity for Extension to utilize online technology to reach nontraditional populations (Bowen, Stephens, Childers, Avery, & Stripling, 2013; Diem, Hino, Martin, & Meisenbach, 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).

Few research studies have focused on Extension’s social media effectiveness in terms of information sharing, community building and dialogue, and promotion and mobilization, which are all key components to effective social media communication (Meyer, Holt-Day, Steede, & Meyers, 2017). Ongoing 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” and has a strong social media presence (Brain, 2015, p.1). However, no research has explored how USU Extension Sustainability uses social media to engage followers. An analysis of the USU Extension Sustainability
Facebook page’s messages provides a needed understanding of Extension social media usage and potential in Utah including types and characteristics of messages that elicit engagement. This information provides Utah Extension professionals with a knowledge of usable tactics to better reach their desired audience. This research supports Research Priority Area 1 of the American Association for Agricultural Education 2016-2020 National Research Agenda by determining how USU Extension Sustainability’s Facebook page informs public opinions about agricultural and natural resources issues (Roberts, Harder, & Brashears, 2016). Additionally, Research Priority Area 5 indicated a need to determine “what methods, models, and programs are effective in communicating with diverse audiences” (Roberts et al., 2016, p. 43).

**Purpose Statement**

The purpose of this study was to explore USU Extension Sustainability’s use of Facebook to engage followers.

**Research Questions and Hypotheses**

1. What characteristics were present in individual posts?

2. What differences exist between individual post characteristics and Facebook engagement rate?

   H1: Posts including graphics will not have a significantly different engagement rate by reach than posts without graphics.

   H2: Posts containing videos will not have a significantly different engagement rate by reach than posts without videos.

   H3: Posts containing a quote will not have a significantly different engagement rate by reach than posts without a quote.
H4: There will be no significant difference on the engagement rate by reach between Facebook posts that include a page mention and those which do not.

H5: There will be no significant difference on the engagement rate by reach between Facebook posts containing hashtags and posts without hashtags.

H6: No significant difference exists between the types of links in Facebook posts and engagement rate by reach.

H7: No significant difference exists between the days the messages were posted and Facebook engagement rate by reach.

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

H8: No significant difference exists between communicative functions and Facebook engagement rate by reach.

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

H9: No significant difference exists between the types of sentiment and Facebook engagement rate by reach.

Limitations of the Study

This study focused solely on one Extension Facebook page. Due to the nature of the study, this information was not generalizable to other Extension Facebook pages but exists as a singular analysis. Additionally, as Facebook is constantly evolving, the results of this study might not remain consistent in future years as the social networking site continues to change.

Because of changes in Facebook data collection, Facebook Insights began providing individual post engagement information on September 4, 2017. Posts published prior to that date do not contain engagement information and, therefore, cannot be
included in this study.

It is necessary to acknowledge flaws in analyzing specific details about content on Facebook. Multi-content posts on Facebook that include videos do not indicate the number of views accumulated. If there are multiple videos in one post, the number of views is not indicated. On Facebook, once a post hits a certain amount of likes or reactions, it changes formatting.

Facebook pages with large audiences typically experience lower engagement than smaller pages (Ken, 2014). The USU Extension Sustainability page has over 3,000 followers (USU Extension Sustainability, 2019b), which may affect the engagement rate in some way.

Multiple coders analyzed the Facebook posts, and some inconsistencies might exist. The primary researcher conducted a training of individual coders before the analysis. Additionally, the researcher ran a statistical analysis to measure intercoder reliability.

**Basic Assumptions**

1. Audience members who engage with the USU Extension Sustainability Facebook page are human beings, not robot accounts.

2. The USU Extension Sustainability Facebook page has an adequate amount and variety of posts to provide an analysis of message characteristics.

3. Followers of USU Extension Sustainability’s Facebook page are interested in the topics and information presented on the page.

4. The USU Extension Sustainability page is an example of an effective Extension Facebook page.
Significance of the Study

Extension needs to find a way to remain relevant and publicly recognized in the 21st century to avoid falling deeper into obscurity in the public’s mind, especially as it has already earned the tagline of being the nation’s ‘best-kept secret’ (Ballard & Nix, 2018; Settle, Brubaker, Hardman, & Downey, 2019). Organizations, such as Extension, must understand how to engage individuals on social media and how to measure success in order to stay relevant in this new technology age (Ballard & Nix, 2018; Kinsey, 2010). Metrics for measuring engagement on Facebook include the number of likes, shares, and comments (Parsons, 2014), which can be compiled into engagement rate by reach, a popular engagement metric for social media marketers (Sehl, 2019). Facebook administrators have placed an increased emphasis on engagement by crafting an algorithm that places posts that foster meaningful interactions higher in the News Feed timeline, thus creating more exposure for the content (Mosseri, 2018). Understanding the characteristics of Facebook posts that engage followers is critical in helping Extension professionals disseminate information to “reach out to new audiences, provide professional guidance and direction, and encourage peer-to-peer interactions while meeting the land-grant Extension mission of increasing knowledge, changing behavior, and assessing the impacts of their programmatic efforts” (p. 1) while using research-based tactics to complete this task (Gharis et al., 2014). This study extends the scope of current research by not only indicating the potential of Facebook as an Extension tool, but by providing a set of “best practices” for Extension professionals to use while creating and posting content to the platform.
Facebook is an underutilized tool for Extension professionals (Newbury et al., 2014). While much of the previous research has explained the need for Extension professionals to expand their digital toolkit, few studies have reported how to effectively use social media platforms to expand their outreach efforts (Gharis et al., 2014; Kinsey, 2010; O’Neill, Zumwalt, & Bechman, 2011). The Facebook page for USU Extension Sustainability has a multi-year history of posting and engaging with an audience using a variety of tactics to disseminate research-based information (USU Extension Sustainability, 2019b). Information discovered as part of the study could help the USU Extension Sustainability program hone content to maximize effectiveness when creating and posting material to the page. This study provided a research-based evaluation of the page’s content, which would be directly applied, if professionals choose, to the outreach strategy of the page. Additionally, professionals administering other Extension Facebook pages might apply the characteristics found to elicit audience engagement as part of their outreach, although audience and content may differ.

**Definitions of Terms**

*Communicative function:* The overall purpose of the message is the communicative function of the post (K. Lovejoy & Saxton, 2012). Communicative functions can be classified as information seeking, community-building and dialogue, and promotion and mobilization.

*Engagement:* Active engagement on Facebook is the number of shares and comments. Passive engagement is when followers like posts, click on posts to read more,
click on links within posts, or click on images (Parsons, 2014).

*Engagement rate by reach:* The total number of engagements (reactions, comments, shares, clicks, etc.) on a post divided by the total reach of that post. This number is often multiplied by 100 to produce a percentage (Sehl, 2019).

*Facebook page:* A Facebook page allows “public figures, businesses, organizations and other entities to create an authentic and public presence on Facebook” by creating a digital page on Facebook that is public to all Facebook users (Hicks, 2010, para. 3).

*Facebook post:* A Facebook post is “any comment and statement which is written on a Facebook profile or page” (Salkhordeh, 2010, p. 13).

*Sentiment.* Sentiment analysis is “the task of detecting whether a textual item (e.g., a product review, a blog post, an editorial, etc.) expresses a positive or a negative opinion in general or about a given entity, e.g., a product, a person, a political party, or a policy” (Nakov, Ritter, Rosenthal, Sebastiani, & Stoyanov, 2016, p. 1).

*Social media:* For the purposes of this study, social media is defined as any site or service available through the web that allows individuals to interact with other users in some way. Facebook, the world’s largest social-networking site, was sometimes referred to as social media in this study (Clement, 2019a).

*Sustainability:* USU Extension Sustainability defines sustainability as “living a daily ethic of mindfulness aimed to improve environmental, economic, and social conditions” (2019a, para. 1).
Summary

Extension’s relevancy in the 21st century has been called into question (Bull et al., 2004), and the program must adapt in order to continue fulfilling its purpose of facilitating positive change about important agricultural and natural resource issues. Audiences are shifting to online communication platforms, with Facebook being the nation’s largest social networking site (Perrin & Anderson, 2019). Although Extension professionals have historically used Facebook, there is a gap in the research determining which tactics on the site, if any, are working for Extension to achieve its goal of engaging with the public on these issues. Additionally, Research Priority Areas 1 and 5 of the American Association for Agricultural Education’s 2016-2020 National Research Agenda indicate a need to inform public opinions about agricultural and natural resource issues, as well as to determine “what methods, models, and programs are effective in communicating with diverse audiences” (Roberts et al., 2016, p. 43).

USU Extension Sustainability was created in 2012 and has consistently posted content to its Facebook page, which consists of over 2,700 page likes and 3,000 followers (USU Extension Sustainability, 2019b). The organization uses Facebook to disseminate sustainability research and information to a diverse audience and seeks to provide “credible information and trainings fostering increased awareness and behavior change to improve environmental, social, and economic conditions” (Brain, 2015; USU Extension Sustainability, 2019a, para. 1).

The purpose of this study was to explore USU Extension Sustainability’s use of Facebook to engage followers. This study helped fulfill the AAAE’s research agenda
priorities and addressed the gap in research evaluating messages as they relate to Facebook audience engagement. In the following chapter, a review of the literature pertaining to this study is conducted. Additionally, a framework is set forth and described to provide direction to the actions taken during this study.
CHAPTER II

REVIEW OF LITERATURE

The theoretical framework for this study was based on uses and gratification theory. The relationship among post characteristics, sentiment, the uses and gratifications of Facebook, and Saxton and Waters’ (2014) communicative functions on engagement provided the conceptual framework. A literature review included Facebook research, user engagement in Facebook, communicative functions of Facebook content, sentiment and polarity, and the effects post characteristics and organizational response have on Facebook engagement rate. Additionally, current literature on social media marketing strategy, uses and gratification theory in relation to Facebook, and current guidelines from USU Extension on Facebook messaging are described.

Social Media

Social media has changed the world and is considered one of the most important social communication advances of all time (Graybill-Leonard, Meyers, Doerfert, & Irlbeck, 2011). Its enormity goes undisputed, but there is much discussion on the effects the advancement has had on society. In a short amount of time, society has gone from knowing nothing about social media to becoming largely dependent on it (J. Cho, Park, & Ordonez, 2013). Generations are being raised without ever knowing a world void of social networking. In 2017, over 80% of the U.S. population had a profile on a social networking site (Clement, 2019b). This dependency makes it imperative that organizations adjust strategies to accommodate this cultural shift (J. Cho et al., 2013;
Schivinski & Dabrowski, 2014; White, 2013).

Perhaps the most unique change created by the advent of social media is the shift to two-way message interactivity, creating dialogue and community between an organization and its followers. Social media provides an opportunity for an audience to follow niche topics of interest and interact with those pages and fellow fans (Weinberg, 2009). It is also a place to meet new people and build relationships, which can impact how people adopt messages (Meyers, Irlbeck, Graybill-Leonard, & Doerfert, 2011; Subramani & Rajagopalan, 2003).

Social media is now prevalent in society, and the most prevalent social media platform in the U.S. is Facebook with 243 million active monthly users in the U.S. and Canada (Facebook, 2019). About 70% of U.S. adults use Facebook, and 74% of those adults visit the site at least once a day (Gramlich, 2019). Facebook has been used to share research-based information to diverse audiences (Cornelisse et al., 2011; Hill, 2014) and could be a powerful tool in helping Extension professionals reach their target audience if used well (Bowen et al., 2013; Mains et al., 2013).

**Social Media Marketing**

The creation and rise of social media opened up marketing avenues outside the traditional sphere, creating the practice of social media marketing. Felix, Rauschnabel, and Hinsch (2017) define social media marketing as “an interdisciplinary and cross-functional concept that uses social media (often in combination with other communications channels) to achieve organizational goals by creating value for
Traditionally, media messaging has been a static procedure involving a sender pushing a message out to a removed public in one-way communication (Zarrella, 2009). With the growing use of online sites, traditional marketing is shifting to accommodate a changing media landscape that allows users to not only listen but interact and create content of their own (Felix et al., 2017; Zarella, 2009). Due to this shift in trends, Weinberg (2009) states that communication, or a two-way dialogue, should be the focus of social media marketing efforts.

Social media marketing provides unique advantages and disadvantages compared to other, more traditional methods. First, the advantage of a lower-cost marketing option can be appealing to organizations that traditionally haven’t been able to compete with larger-scale, higher-budget corporations (Franzen-Castle & Hennemen, 2012; Ghanayem, 2017; Kelsey, 2017; Lake, 2019). Conversely, social media marketing may require paid advertising that, although affordable on the small scale, can also require many resources (Kelsey, 2017). Additionally, social media marketing requires a lot of time, which is not a free resource (Ambrose, 2010; Franzen-Castle & Hennemen, 2012). According to Stelzner (2011), 58% of marketers are spending six hours or more each week on social media marketing efforts. An additional 34% are spending 11 or more hours on social media marketing, and 15% are spending 20 hours or more on social media each week (Stelzner, 2011).

Another significant advantage of social media marketing is the relationship-building aspect of connecting with consumers at a place they freely choose to visit
(Ambrose, 2010; Lake, 2019; Weinberg, 2009). Customers can freely engage with an organization and provide free promotion by sharing content from the page and providing positive (or negative) word-of-mouth to their online circles (Ambrose, 2010; Lake, 2019; Weinberg, 2009). Engaging with stakeholders provides organizations with an opportunity to forge and build relationships with their audience members, something that traditional methods lack (Ghanayem, 2017).

Social media marketing requires strategy in order to maximize effectiveness (Barnhart, 2018a). First, an organization should set measurable goals and clearly define the objectives for using the platform (Barnhart, 2018a; Newberry, 2019a). These goals should include quantifiable objectives and ways to determine success, although it should be noted that results do not happen overnight and success may be difficult to measure (Newberry, 2019a; Weinberg, 2009). Setting SMART goals (specific, measurable, attainable, realistic, and timely) can help marketers when formulating objectives for their brand or organization’s social media efforts (Newberry, 2019a; Weinberg, 2009). Return on Investment (ROI) should be considered when setting objectives and evaluated regularly when determining effectiveness of social media marketing (Barnhart, 2018a; Dawley & Aynsley, 2018). Potential ways of measuring ROI include:

- Reach
- Audience engagement
- Site traffic (Dawley & Aynsley, 2018)

Next, an organization should determine a target audience and craft compelling content catered to the desired population (Newberry, 2018; Sprout Social, n.d.; Weinberg, 2009). Personalized content increases the likeliness of conversion of audience members
to the brand or organization (Newberry, 2018; Sprout Social, n.d.). Key attributes to consider are demographics of audience members, geography, where the audience members like to spend their time, what tools and services audience members use regularly, and content preferences (Sprout Social, n.d.; Weinberg, 2009). Creating content with the target audience’s needs in mind gives organizations a better chance of driving engagement from their followers on Facebook (Tran, 2019). This can include creating meaningful conversations that are useful or interesting to the follower, providing them a reason to return and engage with the organization again and again on Facebook (Barnhart, 2018b).

Finding key influencers that target the same, or a similar, target audience (Newberry, 2019b) can also help drive engagement. By following and interacting with pages that already have a large fan base, organizations can establish relationships with these influencers and achieve valuable word-of-mouth references and possible collaborations (Bullock, 2018; Newberry, 2019b; York, 2018). Actively engaging with the page through comments, shares, and likes can help break the ice and create relationships with the influencers for further collaboration (York, 2018). Influencers should be chosen carefully to ensure that motives and goals align with the organization, and their following is comprised of the intended core demographic (Bullock, 2018; York, 2018).

Other tactics that may help boost engagement include offering incentives, keeping messages short, using graphics and videos (including live video), asking questions, and including calls to action (Barnhart, 2018b; Newberry, 2018). Live video allows audience
members to interact with an organization in real-time, which can forge relationships between the members and the organization and can create six times more engagement than regular videos (Mosseri, 2018; Newberry, 2018; Stelzner, 2018). Using incentives and giveaways can also improve the chances of audience members engaging with posts and a page (Smith, 2012). Keeping content short caters to typical consumers who spend, on average, 1.7 seconds viewing a piece of content on Facebook (Facebook IQ, 2017; Newberry 2018b). Asking quick questions and providing relevant calls to action also potentially drive engagement because these tactics create an easy way for consumers to engage with a page (Barnhart, 2018b; Newberry, 2018).

Developing a social calendar and utilizing a social dashboard help social media personnel manage social media platforms more effectively and efficiently (Virgillito, 2014). The tools available on the dashboard, including a social calendar scheduler, allow managers to publish and post synchronously on various platforms, collaborate with other team members, and view analytics (Virgillito, 2014; York, 2017). This allows managers to save time and resources in their social media management efforts (Virgillito, 2014).

**Theoretical 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, Lawlor, & Rowley, 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, Cho, & Roberts, 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, Lamm, Bunch, & Lundy, 2019; Maresca, 2018; Meyers, Gracey, Irlbeck, & Akers, 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 to followers (Gummerus, 2012).

Facebook users also use the platform to seek information (Hughes, Rowe, Batey, & Lee, 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 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).
Conceptual Framework

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.

![Conceptual Model Diagram]

*Figure 1. Conceptual model of components that influence engagement rate by reach.*
Sustainability Communication

Sustainability is a growing topic of interest among U.S. consumers, and many companies and brands are using social media to communicate with an audience on sustainability topics (Blue & Green Tomorrow, 2015; Carpenter, Takahashi, Cunningham, Lertpratchya, 2016; Reilly & Hynan, 2014). Topics of discussion include both corporations’ and higher education’s use of Facebook and other social media platforms to communicate about sustainability. In a study of 475 global corporations and popular brands, the most-discussed sustainability topic was health and wellness followed by sustainable sourcing and charitable causes (Blue & Green Tomorrow, 2015). Carpenter et al. reported that sustainability officers and student leaders at 21 higher education institutions indicated that social media is a tool to disseminate information and call faculty, students, and staff to action in participating in more sustainable practices.

Sustainability communication is seeing increased focus as an important topic in which to engage Extension clientele (Brain & Dove, 2017). However, there are various benefits and barriers to county Extension agents educating audiences about agriculture and natural resource issues (Brain, Irani, Hodges, & Fuhrman, 2009). As the result of an internet study, Brain et al. discovered that Extension agents’ biggest perceived barriers in communicating these issues was the “lack of interest, knowledge and awareness among all target audiences” (p. 8), as well as a lack of access to resources and inconsistent and ineffective message delivery methods. Brain and Dove discovered similar findings regarding barriers to Extension sustainability education. Their national research with
Extension educators uncovered the biggest issues in educating about sustainability topics, which were (in order of importance):

- communication (this includes maintaining a clientele base while talking about politically charged issues, how to tie in sustainability with various clientele values, etc.);

- lack of community interest/competing priorities;

- community collaboration (this includes having time to engage and find what is important to communities, a two-way feedback loop between [the] office and the community, etc.);

- lack of staff professional development; and

- overcoming institutional barriers (this includes needing upper administrative support, the need to expand Extension’s traditional role, etc.) Brain & Dove, 2017, p. 4

Extension educators in the national study believed the top five most critical emerging areas of sustainability include water quality, climate change impacts, environmental education, economic development, and nutrition/health education (Brain & Dove, 2017). These same educators believed that the areas Extension does best at addressing are nutrition education and water quality, but they believe Extension poorly addresses food access and economic development (Brain & Dove, 2017). The five thematic sustainability areas that USU Extension Sustainability focuses on in Facebook communication include land, air, food, energy, and water (USU Extension Sustainability, 2019b).

Sanagorski (2014) stated Extension professionals should be using social marketing tactics to foster audience behavior change in sustainability areas. Among college-age audiences, social marketing using social media is a more effective knowledge, attitude, and behavior change tool than educational programming alone.
(Carpenter et al., 2016; Marcell, Agyeman, & Rappaport, 2004). No research was found indicating whether Extension has employed these tactics on a social media platform, although a need was recognized for Extension to stay relevant and adapt to new and emerging technologies in programming and communication efforts (Bull et al., 2004).

**Utah State University Extension Facebook**

Facebook makes up half (49%) of USU Extension’s social media audience (Saxton, 2017). Demographically, 82% of audience members are female and the largest number of followers are in Salt Lake County. Due to its nature as an educational institution, a focus has been placed on sharing educational materials through social media platforms to provide followers with further resources (Saxton, 2017). Extension has set a goal to be responsive to audience members’ comments and questions, with an aim to answer questions within 24 hours whenever possible. In terms of general social media, USU Extension has set the following goals to increase engagement on social media platforms:

- Liking content shared by followers
- Liking content shared with relevant hashtags
- Sharing, retweeting, and reposting useful content
- Commenting on posts shared by followers where appropriate
- Tagging followers on Instagram and Twitter where appropriate. (Saxton, 2017, p. 11)

Although post reach is noted, USU Extension did not disclose its Facebook engagement rate.

USU Extension Sustainability’s Facebook page has nearly 3,000 followers and
over 2,700 likes (USU Extension Sustainability, 2019b). According to Facebook Insights (2019), 68% of the page’s followers are women and 30% are men. The majority of followers (55%) range from 25- to 44-years-old. Almost all followers (2,408) reside in the U.S., but there are followers living in Canada, Australia, India, the United Kingdom, Brazil, Mexico, Italy, Pakistan, and the Philippines. Most followers reside in Utah or surrounding states.

**Communicative Functions**

Social media presents new functions for how organizations communicate with and engage audiences (i.e., clients, volunteers, the media, and the general public). In a pivotal study, K. Lovejoy and Saxton (2012) determined three main categories of communicative functions in relation to organizations’ Twitter messages: information sharing, community-building and dialogue, and promotion and mobilization. Saxton and Waters (2014) built upon this research and analyzed 1,000 messages to study the primary functions of Facebook content shared by nonprofit organizations. As a result of the study, Saxton and Waters determined five themes that were condensed into three main communicative functions: information sharing; community-building and dialogue; and promotion and mobilization.

The information-sharing function reverts back to the original role of media in producing one-way information flow from a sender to a passive audience (King, Meyers, Baker, & Doerfert, 2016; K. Lovejoy & Saxton, 2012; Saxton & Waters, 2014). Saxton and Waters (2014) stated the key component of the information-sharing function is “that it is focused on the organization in question, its mission, and its programs and services, or
other relevant information the organization believes is of interest to its fans” (p. 286). Examples of content with this type of function are news about an event, facts, or reports (Meyer et al., 2017). The majority of the non-profit organizations’ messages fell under the information category (Saxton & Waters, 2014). Although the least engaging of the three categories, information is a vital part of organizational communication. Informational messages can also be used in conjunction with other functions for more complex purposes (K. Lovejoy & Saxton, 2012). King et al. (2016) affirmed this finding in research relating to international rural development nonprofit organizations’ use of Facebook through a quantitative content analysis.

The community-building and dialogue function of content encourages users to engage on the page with the organization and other fans (K. Lovejoy & Saxton, 2012; Saxton & Waters, 2014). The focus is on conversations, building relationships, and networking. Posts encourage members to build a community and interact on the page (Meyer et al., 2017). This function focuses on the two-way interactivity aspect of social media and facilitates communication among followers. The community-building and dialogue function can let social media personnel determine what sustainability issues and topics are important to the audience while creating a sense that the audience should play an active role in sustainability efforts (Carpenter et al., 2016).

The last function, focused on action, is promotion and mobilization. This function is also one-way in nature. However, the defining characteristic of the message is that it encourages users to act as a result of the shared content (Saxton & Waters, 2014). Desired actions range from fundraising efforts, such as a request for donations, to
messages soliciting involvement in the organization (Meyers et al., 2015; Saxton & Waters, 2014). Call-to-action messages encourage an organization’s Facebook users to lobby, advocate, or volunteer. Ultimately, this function views audience members as agents to help the organization fulfill its objectives and mission and is the most outcome-oriented function (K. Lovejoy & Saxton, 2012).

K. Lovejoy and Saxton (2012) discovered that organizations used new (social) media for two primary purposes: information sharing and dialogic relationship building. Diverging from Saxton and Waters (2014) and King et al. (2016) findings, Meyer et al. (2017) determined that, overall, community-building and dialogue was the most used function of Facebook content for the national Teach Ag campaign and was used in a third of messages. Community was the least used function in social media sustainability communications at higher institutions (Carpenter et al., 2016). Information sharing was slightly less used by the National Teach Ag campaign (Meyer et al., 2017). Overall, the promotion and mobilization function was the least commonly used among the literature, although it was slightly more prevalent in Saxton and Waters’ findings (King, 2016; Meyer et al., 2017). However, Carpenter et al. found the promotion and mobilization purpose to be the most prevalent function in higher education’s social media use for sustainability communication among 21 institutions considered top sustainability universities in the U.S.

Despite information sharing being the most commonly used communicative function overall, posts identified as containing the community-building and dialogue function elicited the highest amount of user engagement (King et al., 2016; Meyer et al.,
2017). This points to a gap in organizational messaging, indicating that organizations are opting to post purely informative content despite other functions fulfilling the role of two-way communication better by eliciting more dialogue and engagement (King, 2016; King et al., 2016; Meyer et al., 2017; Saxton & Waters, 2014).

As indicated by the literature, organizations should focus on community-building and dialogue message functions or a mix of functions in order to engage with the target audience on Facebook (King et al., 2016; K. Lovejoy & Saxton, 2012; Meyer et al., 2017; Saxton & Waters, 2014). While literature has focused on agricultural and nonprofit organizational messaging, as well as higher institutions’ use of social media in sustainability communication, there is a gap in the current research regarding Extension’s use of communicative functions in its organizational messaging.

**Effects of Post Characteristics on Facebook Engagement**

Facebook allows its users the flexibility to create or share different types of content 24/7 to the online platform. Content can contain a wide range of post characteristics (King, 2016; Maresca, 2018; Meyer et al., 2017). Facebook users can post original or created content to the page, receiving full credit for the work or providing proper attribution in the post, or share content that is already available on the platform. Sharing content created by followers or fans onto a business page can create a larger sense of community, which leads to increased engagement (Bramble, 2018; Sukhraj, 2017). However, allowing followers to post to a page without a gatekeeper reviewing messages may lead to off-brand, unprofessional, or inappropriate content (R. Brain
Additional post characteristics include the date and time of posting; the use of text, graphics, and video content; and the use of quotes, tags, embedded links, location and hashtags. Posts can contain a various mixture of these characteristics in a variety of combinations, and post characteristics can fluctuate throughout the history of page posting. Audience engagement differs by post characteristics (King, 2016; Maresca, 2018; Meyer et al., 2017). King found that posts containing text performed higher than those without, although these findings were not statistically significant.

Meyer et al. (2017) discovered that posts containing videos had a slightly higher average number of comments, but lower shares and reactions than posts without videos; posts containing graphics had a slightly higher level of reactions and comments than those without (Meyer et al., 2017). These findings agree with other research indicating that posts containing a graphic or video perform better than text-only or other content types, although organizations tend to use videos less than other content forms (Chachere & Gibson, 2018; King, 2016; King et al., 2016; Maresca, 2018; Repovienė & Pažėraitė, 2018). Bortree and Seltzer (2009) discovered that only 7.7% of posts in their study contained video, indicating that this Facebook feature is underutilized when compared to the growing popularity of videos on Facebook. Beattie et al. (2019) found that Extension personnel over a county 4-H Facebook page posted mainly text and pre-recorded videos, which also received the largest number of shares compared with other content. Additionally, audience members of a separate county 4-H Extension Facebook page have indicated they prefer to see photos of past events posted to the page (Schachtschneider,
Quotes, used well, can help drive engagement for certain organizations (Bunskoek, 2013; Hutchinson, 2015). The quote characteristic can create a sense of community and can help associate a brand with an overall positive and deep connection with other organizations, entities, or ideas (Bunskoek, 2013). However, if used poorly, quotes can come off as annoying to followers (Hutchinson, 2015).

Tagging relevant Facebook pages appropriate to the post may also help increase engagement (Smith, 2017). Posts containing tags in the narrative or body of the message will appear on the corresponding tagged post’s page, effectively carrying the content to a new and potential audience. Repovienė and Pažėraitė (2018) determined that the number of tags included in a post had a slight positive association with engagement rate; however, these findings were not statistically significant.

Use of embedded links, hashtags, and location tag ranged widely among the studies. Maresca (2018) noted that embedded links were rarely used by organizations. However, nearly half the posts during the Teach Ag Campaign contained an embedded link (Meyer et al., 2017). Posts containing embedded links have a lower level of engagement than those without (Meyer et al., 2017; Repovienė & Pažėraitė, 2018). Meyer et al. discovered that the organization consistently posted with branded hashtags, an identifier for the social media Teach Ag campaign. However, despite information indicating that hashtags can help drive engagement for a campaign (Kissane, 2015), there was no significant difference in engagement between posts that included hashtags and those without (Meyer et al., 2017). Ayres (n.d.) recommended only using one to two
hashtags for Facebook posts, as engagement may suffer when higher numbers of hashtags are included in the post. Consistent with this recommendation, Meyer et al. concluded engagement dropped when more than two hashtags were used as part of the post. Repovienė and Pažėraitė (2018), however, determined that the number of hashtags was moderately associated with positive engagement, a statistically significant discovery. The average of number of hashtags included in posts was 3.7 (Repovienė & Pažėraitė, 2018). There was no significant association between the number of location tags in a post and Facebook engagement (Repovienė & Pažėraitė, 2018).

Users engage with posts at different times of day, with certain patterns indicating there are high and low traffic days and times (Arens, 2019; Beattie et al., 2019). In social media marketing research, time has been indicated as an important factor to consider in order to potentially experience higher engagement (Pletikosa Cvijikj & Michahelles, 2013). Specifically, weekday posting at peak user hours (late afternoon and evening) provides a higher chance of user engagement (Pletikosa Cvijikj & Michahelles, 2013). Arens supports this finding, stating the best day to publish Facebook content is Wednesday at 11 a.m. or 1 p.m. Overall, content posted between 9 a.m. and 3 p.m. has the greatest chance of experiencing heightened engagement, with Sunday being the least active day for Facebook users (Arens, 2019). Beattie et al. applied the principle of stakeholder engagement patterns to Extension social media usage and, contrary to other literature, discovered that urban counties experienced the highest engagement on Sundays while more rural counties engaged most on Fridays. Both counties engaged most at night around 8 or 9 p.m. (Beattie et al., 2019).
The amount of posts shared throughout the day may also affect engagement. The frequency of posting depends on the size of the organization (Kolowich, 2015). For a page with less than 10,000 followers, page administrators should post approximately 1-2 times a day (Social Report, 2018).

**Effects of Organizational Response on Engagement**

Facebook is a two-way communication platform, and organizations can respond and comment on followers’ actions on the page. Users prefer to be noticed and acknowledged by the organization, creating a tighter sense of community and belonging (Bortree & Seltzer, 2009; Kent, Taylor, & White, 2003; King et al., 2016; Meyer et al., 2017). Bortree and Seltzer recommend appointing a specific person or group to monitor the page and respond to consumers in order to further dialogue among the organization and stakeholders. When an organization engages with stakeholders on a post by commenting and interacting with other users, the overall engagement (likes, comments, and shares) increases (King, 2016). However, organizations often fail to engage with stakeholders and rarely comment and reply to messages (King, 2016; King et al., 2016; Meyer et al., 2017).

**Sentiment and Polarity in Facebook Communications**

Content can involve a positive, negative, or neutral sentiment within a message (Maresca, 2018). Sentiment analysis is “the task of detecting whether a textual item (e.g., a product review, a blog post, an editorial, etc.) expresses a positive or a negative opinion
in general or about a given entity, e.g., a product, a person, a political party, or a policy” (Nakov et al., 2016, p. 1). If a post portrays a positive sentiment then the overall opinion of the post is understood as positive (Cambria, Schuller, Xia, & Havasi, 2013; Maresca, 2018), which is indicated by the use of opinion words such as good, wonderful, and amazing in the text (Liu, 2012). Posts with negative sentiment portray a negative opinion, as indicated through words such as bad, poor, and terrible (Liu, 2012). Certain phrases and idioms can also portray a positive or negative sentiment depending on the cultural context (Liu, 2012). Neutral sentiment indicates the text was not identifiable as either positive or negative, and is sometimes included as positive in order to more easily distinguish text portraying negative sentiment (Maresca, 2018). An accurate understanding of sentiment can be crucial for making important organizational decisions (Cambria et al., 2013).

Limited research is available on the impact of sentiment and polarity on Facebook sustainability communications, although studies have discussed sentiment in other agricultural topics and a need for future research to include a sentiment analysis of messages has been mentioned (Meyer et al., 2017; Steede, Meyers, Li, Irlbeck, & Gearhart, 2018).

Maresca (2018) discovered that positive sentiment was common for Facebook communications involving major livestock shows, and there was a relative amount of neutral sentiment in posts as well. Although there was a low amount of negative sentiment, the most engaged post on Facebook exhibited this characteristic. Additionally, a content analysis of Twitter discussions involving agricultural antibiotics revealed that
major social media influencers discussed the issue with a largely negative sentiment, pointing toward a need for other organizations to provide accurate, positive information that elicits audience engagement and trust (Steede et al., 2018).

Sentiment can be difficult to measure, and there are limited tools for analysis (Bermeo-Almeida, Cioppo-Morstadt, Cardenas-Rodrigues, Cabezas-Cabezas, & Bazan-Vera, 2019; Steede et al., 2018). Steede et al. discovered that while some analysis programs can accomplish much, it is beneficial to provide a human check on the system to ensure coding is valid. Bermeo-Almeida et al. found their system for automated sentiment analysis was valid, which may provide viable assessment opportunities moving forward. However, sentiment may vary based on content and scope of Facebook pages, requiring a need for further research to discover the impact of sentiment on engagement.

Engagement in Facebook Communications

Organizations have been eager to adopt Facebook as a communication tool, but research indicates organizational use often employs one-way, static communication techniques and does not maximize the full potential of social networking sites as interactive platforms (M. Cho, Schweickart, & Haase, 2014). Two-way communication, requiring stakeholder engagement, should be the goal of social media efforts (Weinberg, 2009), and Facebook is an ideal stakeholder engagement vehicle (K. Lovejoy & Saxton, 2012). Audience engagement on Facebook is context dependent and can result in consumers’ increased trust, loyalty, and improved relationship with the organization (Gummerus, 2012).

Although engagement is a desirable outcome of Facebook messaging, it is
important to note that not all audience members interact with the social media platform in the same way, and their behavior may be dependent on a variety of factors such as time or knowledge of the platform (Brandtzæg, Heim, & Karahasanovic, 2011; Gummerus, 2012). Additionally, users may be long-term followers who consistently engage with a page and others may be one-time consumers of content (Gummerus, 2012).

Determining engagement rate can help organizations better understand the success of the page and its audience’s involvement with the content (Ken, 2014; Repovienė & Pažėraitė, 2018). To determine the engagement rate of content, the number of users who engaged with the post is divided by the total reach of the post (Vora, 2018). Although engagement is an important metric of social media endeavors, research shows that, regardless of the organization or industry, less than 5% of followers engage on social media (Nelson-Field & Taylor, 2012). An engagement rate of 1 to 2% is considered healthy for Facebook audiences (Ken, 2014), although the average Facebook engagement rate for all types of posts is 3.75% (Kemp, 2019).

Facebook users can engage in three main ways: reactions, comments, and shares (Repovienė & Pažėraitė, 2018). Reactions, a recent feature of Facebook, allow users to indicate their response to content as “like,” “love,” “haha,” “wow,” “sad,” and “angry” (Meyer et al., 2017). However, Facebook Insights (2019) codes all reactions under the “like” category. Audience members can also interact with content and others by commenting on posted material. Last, users can also share material from the page on their personal profile or other pages they follow.

Different engagement behaviors are weighted differently. Reacting is an easy way
for users to engage with content, requiring minimal effort on behalf of the audience member to complete the action (M. Cho et al., 2014). In order to react to content, audience members need only click a mouse. This requires very little cognitive effort or psychological processing on behalf of the consumer (Kim & Yang, 2017). Sharing content allows users to not only process the material but become ambassadors of the organizational message to their own personal following (M. Cho et al., 2014). The last engagement indicator, commenting, allows users to respond to page content by providing their own input. Commenters can also see other responses to the post, allowing dialogue and discussion to occur between followers and the organization. This is the highest form of engagement as it requires the most cognitive involvement, and it is weighted by the Facebook algorithm as twice the worth of a share (M. Cho et al., 2014; Kim & Yang, 2017).

Summary

In this chapter, a theoretical and conceptual framework was set forth involving the uses and gratifications theory, social media marketing, communicative functions of Facebook messages, sentiment and polarity, message characteristics, and organizational response in relation to engagement on the platform.

Uses and gratification theory provided the theoretical framework for this study (Katz, 1959). The theory has been adapted to social media research to study the purposes and reasons behind why an audience selectively seeks out and consumes social media, specifically Facebook content, to fulfill a specific need (Dolan, 2015; Dunne et al., 2010;
Maresca, 2018; Ruggiero, 2000).

The relationship between Facebook engagement rate by reach and post characteristics, post sentiment, communicative functions, and the uses of Facebook provided the conceptual framework for this study. These variables were compiled in a conceptual model to highlight potential relationships.

Social media marketing is an emerging and quickly growing field. Concepts from social media marketing apply to any form of communication that seeks to engage an online audience in a two-way dialogue in order to achieve an organization’s goals, which should be carefully set and measured (Zarrella, 2009). The ubiquitous and inexpensive nature of social media provides a potential platform for non-profit organizations to enter into the marketing world, whereas the cost of participation traditionally created a potential barrier.

Sustainability communication has become an increasingly important and trending topic of interest (Blue & Green Tomorrow, 2015; Carpenter, et al., 2016; Reilly & Hynan, 2014), including in Extension (Brain & Dove, 2017). Despite its rising popularity, Extension personnel have indicated some potential barriers to sustainability communication, which include

- Lack of interest, knowledge and awareness among all target audiences
- Lack of access to resources
- Inconsistent and ineffective message delivery messages. (Brain et al., 2009, p. 8)

Extension educators believed that some sustainability areas are more critical to discuss with others, with the top five emerging areas being
• Water quality
• Climate change impact
• Environmental education
• Economic development
• Nutrition/health education

In social media communication, there are three main purposes of organizational messages: information sharing; community-building and dialogue; and promotion and mobilization (K. Lovejoy & Saxton, 2012; Saxton & Waters, 2014). Of these three, information-sharing is the most basic, although vital, function as it seeks to engage consumers in one-way communication. 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 nature and invites followers to assist the organization in some way.

Certain post characteristics have been suggested as being influential to increased or decreased 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; Sukhraj, 2017). Engaging with followers can also help facilitate a positive, interactive community (Bortree & Seltzer, 2009; King et al., 2016). The use of visual elements, such as a graphic or video, may be linked with increased engagement, although these are underutilized 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).

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

Engagement is a necessary metric to determine the success of Facebook communication (Dawley & Aynsley, 2018; Ken, 2014), 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 (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).
CHAPTER III
PROCEDURES

The purpose of this study was to explore USU Extension Sustainability’s use of Facebook to engage followers. This research helped fill a gap for research-backed tactics for USU Extension to better engage followers and fulfill the land-grant mission.

The research questions and hypotheses guiding this study were the following.

1. What characteristics were present in individual posts?

2. What differences exist between individual post characteristics and Facebook engagement rate?

H1: Posts including graphics will not have a significantly different engagement rate by reach than posts without graphics.

H2: Posts containing videos will not have a significantly different engagement rate by reach than posts without videos.

H3: Posts containing a quote will not have a significantly different engagement rate by reach than posts without a quote.

H4: There will be no significant difference on the engagement rate by reach between Facebook posts that include a page mention and those which do not.

H5: There will be no significant difference on the engagement rate by reach between Facebook posts containing hashtags and posts without hashtags.

H6: No significant difference exists between the types of links in Facebook posts and engagement rate by reach.

H7: No significant difference exists between the days the messages were posted and Facebook engagement rate by reach.

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

H8: No significant difference exists between communicative functions and Facebook engagement rate by reach.
4. What are the differences between the types of sentiment and Facebook engagement rate?

H0: No significant difference exists between the types of sentiment and Facebook engagement rate by reach.

Research Design

This study used a quantitative content analysis of existing posts on the USU Extension Sustainability Facebook page. Content analysis, a specific and defined search for messages that are intended to convey meaning of some sort within content, is a powerful and well-established tool for analyzing Facebook messages (Kerlinger, 1986; Krippendorf, 2003; Neuendorf, 2016). The use of content analysis allows large amounts of data to be sorted and analyzed in a systematic way (Maresca, 2018; Neuendorf, 2016). This approach allows researchers to make inferences about the message, message senders, and the audience of the message (Maresca, 2018; Weber, 1990). This methodology is growing in popularity and is often used for non-traditional message analysis (Krippendorff, 2003; Neuendorf, 2016).

Some disadvantages and limitations are associated with content analysis methodology (Holsti, 1969; Riffe, Lacy, & Fico, 2014; Wimmer & Dominick, 2011). Critics of quantitative content analysis state there is too much emphasis placed on the “comparative frequency of different symbols’ appearance” (Riffe et al., 2014, p. 36). Holsti recommends using a mixed methods approach to counteract this emphasis and furthers that a quantitative approach trivializes data into countable numbers while ignoring other data that may not be obtained as easily. However, scholars counter this argument by stating that trivial research is trivial research, regardless of methodology.
(Riffe et al., 2014). Additionally, special care is needed to ensure that individuals do not apply their own personal interpretations to content, an issue that can be mitigated through the proper training and supervision of coders (Krippendorff, 2003; Riffe et al., 2014). Another possible limitation associated with content analysis is that the findings are affected by the categories and definitions provided by the researchers, which may cause variation among studies’ findings (Wimmer & Dominick, 2011). Lastly, a content analysis alone is not a sufficient method to determine the effects of content on an audience (Wimmer & Dominick, 2011).

Messages must meet certain criteria to be considered for content analysis (Krippendorff, 2003; Maresca, 2018). First, Krippendorff (2003) states that messages must be produced with the intent to be read and understood by other people, not just the researchers. If there are no meanings that can be interpreted and understood by an audience, no audience, or no creator of the message than the text does not exist (Krippendorff, 2003). However, messages need not be shared by an audience to be considered for content analysis. Krippendorff further elaborates that text must contain messages that can easily be identified, although different groups and people may interpret the identified messages differently. Due to the nature of these messages, researchers must infer their own interpretations of the message as the symbols, graphics, etc., do not explicitly convey the meaning (Krippendorff, 2003; Maresca, 2018).

**Population and Sampling**

Content from the USU Extension Sustainability Facebook page was the
population for this quantitative content analysis due to its prominence as the fifth most followed page at USU as of early 2016 (R. Brain McCann, personal communication, July 2, 2019), its recognition as one of the nation’s leading states for sustainability outreach (Brain, 2015), its long history of consistent posting (USU Extension Sustainability, 2019b), and its relevance to the national research agenda and need for sustainability communication (Roberts et al., 2016). Additionally, Facebook is the most widely used social media platform in the U.S. (Perrin & Anderson, 2019).

Existing Facebook posts ($n = 505$) since September 4, 2017, on the USU Extension Sustainability Facebook page were taken for this quantitative content analysis because Facebook Insights started tracking individual and page data on that date. Based off Wimmick and Dominick’s (2011) recommendations and previous research, individual Facebook posts were the unit of analysis for this study (Reichenbach, 2014).

**Instrumentation**

A codebook was used to compile Facebook post data (Appendix A). The codebook was adapted from existing codebooks shared by Meyer et al. (2017) and Chachere and Gibson (2018), which focused on quantitative content analyses of agricultural Facebook messages. The codebook was also derived from previous literature (King, 2016; Maresca, 2018; Saxton & Waters, 2014). Two undergraduate coders used the codebook to help ensure acceptable intercoder reliability.

**Independent Variables**

The codebook was created a priori and was divided into three independent
variables that are based on the conceptual model for the study: post characteristics, communicative functions, and sentiment. These independent variables may affect the level of engagement on the post. Post characteristics, communicative functions, and sentiment were then divided into sub-categories for more detailed information such as the time and day of posting, what type of post, the sentiment of the post, etc.

**Post characteristics.** Post characteristics included post month, post day, post time, text, graphic, video, quote, link, location tag, hashtag, and areas of sustainability. 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 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. Lastly, the areas of sustainability (land, food, water, energy, and air quality and climate change) were also included as an independent variable of the study.

**Communicative functions.** The communicative functions included in this study 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 USU Extension Sustainability organization. This included job postings, suggesting followers adopt specific sustainable behaviors, etc.

Sentiment. The sentiment of USU Extension Sustainability Facebook posts were 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 or negative sentiment. Negative posts were those that connotated 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.

Dependent Variable

Engagement rate by reach was the dependent variable. Engagement rate by reach is a formula that divides the number of engaged users by the total reach of each post. 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 in their Facebook feed.
Validity

A panel of five experts including faculty members in agricultural communication, agricultural literacy, sustainability communication, and extension at land-grant and other universities across the nation reviewed the codebook to determine face validity and ensured no errors were present to the best of their knowledge.

Reliability

Two undergraduate coders were trained in-person simultaneously by the researcher on how to proceed with the coding process. During the training, clarification issues arose from the undergraduate coders and minor edits were made to the codebook regarding wording and definitions of variables to allow for better understanding for both coders.

Following the training session, the undergraduate coders independently coded 10% of the Facebook posts \((n = 56)\) on the USU Extension Sustainability page, which were randomly selected. While recommendations vary, the majority of researchers agree that a content analysis pilot test should minimally include 10% of the population of content to maintain accuracy (Lombard, Snyder-Duch, & Bracken, 2010; J. Lovejoy, Watson, Lacy, & Riffe, 2014; Wimmer & Dominick, 2003). Facebook posts included in the pilot test were not included in the final analysis.

Data were analyzed and reviewed for any discrepancies, and percentage agreement and Krippendorff’s alpha were used to measure intercoder reliability. An agreement of 0.8 for Krippendorff’s alpha was preferable; however, a minimum value of
0.68 is adequate (Denzin & Lincoln, 2011; Krippendorff, 2004). 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, 2011). These variables included post type, video inclusion, location tag, page mention, and sentiment. Percent agreement and Krippendorff’s alpha for each variable is indicated in Table 1. For the remaining link type variable that did not meet the preferred .8 requirement, a retraining was conducted and clarification regarding communicative functions, areas of sustainability, and link types were added to the codebook and discussed in the retraining. Coders were then advised to recode the communicative functions variable in the pilot test as significant changes were made to the codebook.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percent agreement</th>
<th>Krippendorff’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post month</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Post day</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Post type</td>
<td>85.7</td>
<td></td>
</tr>
<tr>
<td>Text</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Graphic</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Video</td>
<td>98.2</td>
<td></td>
</tr>
<tr>
<td>Quote</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Link</td>
<td></td>
<td>0.76</td>
</tr>
<tr>
<td>Location tag</td>
<td>96.4</td>
<td></td>
</tr>
<tr>
<td>Page mention</td>
<td>96.4</td>
<td></td>
</tr>
<tr>
<td>Hashtag</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Areas of sustainability</td>
<td></td>
<td>0.85</td>
</tr>
<tr>
<td>Sentiment</td>
<td></td>
<td>92.9</td>
</tr>
<tr>
<td>Communicative functions</td>
<td></td>
<td>0.89</td>
</tr>
</tbody>
</table>

Note. * Posts that did not contain sufficient variability to allow for the appropriate use of Krippendorff’s alpha.
regarding the variable. These changes included the elimination of a fourth category, which indicated a mix of communicative functions was present. Coders were retrained to determine a dominant communicative function as many posts contained a mix of functions, but a dominant function was present. This allowed researchers to gain more accurate and specific data from the posts and presented a clearer picture of what communicative functions were present in USU Extension Sustainability Facebook posts as done in previous research (K. Lovejoy & Saxton, 2012; Saxton & Waters, 2014). After the two undergraduate coders finished recoding the communicative functions variable in the pilot test, the researcher conducted a Krippendorff’s alpha to establish intercoder reliability for the variable. The variable received a Krippendorff’s alpha of 0.89, exceeding the minimum reliability level. The remaining 90% of USU Extension Sustainability Facebook posts \( n = 505 \) were randomly divided and assigned to each coder.

**Data Collection**

This study used Facebook Insights and human coding for data collection. The researcher was granted administrator access to the Facebook page in order to view individual metrics of each post. Facebook Insights is a free analytics tool provided by Facebook and provides information about the total post reach and engagement rate.

Human coders coded the remaining variables of post month, post day, post time, text, quote, graphic, video, link type, post type, page mention, hashtags, areas of sustainability, sentiment and communicative functions by hand. Sentiment is better analyzed by humans as they are more equipped to comprehend and recognize the
sentiment of messages (Riffe et al., 2014; Steede et al., 2018). Additionally, Facebook Insights does not code for communicative functions, requiring the use of human coders to collect these data. Table 2 depicts which variables were coded through which data source.

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post characteristics</td>
<td></td>
</tr>
<tr>
<td>Post month</td>
<td>Human coder</td>
</tr>
<tr>
<td>Post day</td>
<td>Human coder</td>
</tr>
<tr>
<td>Post time</td>
<td>Human coder</td>
</tr>
<tr>
<td>Text</td>
<td>Human coder</td>
</tr>
<tr>
<td>Quote</td>
<td>Human coder</td>
</tr>
<tr>
<td>Graphic</td>
<td>Human coder</td>
</tr>
<tr>
<td>Video</td>
<td>Human coder</td>
</tr>
<tr>
<td>Link type</td>
<td>Human coder</td>
</tr>
<tr>
<td>Post type</td>
<td>Human coder</td>
</tr>
<tr>
<td>Page mention</td>
<td>Human coder</td>
</tr>
<tr>
<td>Hashtags</td>
<td>Human coder</td>
</tr>
<tr>
<td>Areas of sustainability</td>
<td>Human coder</td>
</tr>
<tr>
<td>Sentiment</td>
<td>Human coder</td>
</tr>
<tr>
<td>Communicative functions</td>
<td>Human coder</td>
</tr>
<tr>
<td>Engagement rate by reach</td>
<td>Facebook Insights</td>
</tr>
</tbody>
</table>

Data Analysis

Once collected, the data were analyzed in SPSS version 24. Research question number one was analyzed using frequencies, percentages, and descriptive statistics. Research question two was analyzed through a series of independent $t$ tests and a Kruskal-Wallis H test with a Bonferonni correction, the nonparametric equivalent to the
one-way ANOVA. Hodge’s $g$ calculated effect size. Research question number three was
was analyzed using the Kruskal-Wallis H test with a Bonferonni correction along with
descriptive statistics for each variable. Research question four was analyzed through
descriptive statistics and an independent samples $t$ test; effect size was determined by
Hodge’s $g$.

Summary

This study was a quantitative content analysis that used a census sampling method
of 505 Facebook posts on the USU Extension Sustainability Facebook page between
September 4, 2017, and September 1, 2019. These dates were chosen because Facebook
began tracking individual and page engagement data on that date.

Data were compiled using Facebook Insights and human coders. A codebook was
compiled from similar existing codebooks and was reviewed by a panel of experts. Two
undergraduate coders were trained on the use of the codebook and conducted a pilot test
of 10% of the posts. When a satisfactory intercoder reliability was met, the remaining
90% of posts were divided between the two coders and coded using the codebook.

Independent and dependent variables were used to analyze the data. Independent
variables included post characteristics, communicative functions, and sentiment. The
dependent variable for this study was Facebook engagement rate by reach. All posts were
analyzed in SPSS version 24.
CHAPTER IV

RESULTS

The purpose of this study was to explore USU Extension Sustainability’s use of Facebook to engage followers in order to inform Extension personnel about tactics that will help them reach diverse audiences through a social media platform. Uses and gratification theory and a conceptual model were used in this study as a framework to assess the relationship between engagement rate by reach and post characteristics, communicative functions, and sentiment. A total of 505 Facebook posts were included in this study; however, one post was discarded because it expired or was deleted from the Facebook timeline, making it inaccessible to coders during data collection.

Research Question One: What Characteristics Were Present in Individual Posts?

Descriptive statistics of frequency and percentage were calculated to determine what characteristics were present in the 504 individual USU Extension Sustainability Facebook 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, hashtags, and areas of sustainability.

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 amount 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 the organization ($n = 462, 91.7\%$). 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 ($n = 256, 50.8\%$). Text-only posts were the least common ($n = 3, 0.6\%$) followed by the use of videos ($n = 4, 0.8\%$). Food was the most common area of sustainability detected in posts ($n = 164, 32.5\%$) followed by land ($n = 102, 20.2\%$). Water ($n = 24, 4.8\%$) and energy ($n = 19, 3.8\%$) were the least common. Table 3 depicts the frequency of characteristics depicted in USU Extension Sustainability Facebook posts.

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 ($n = 1, 0.2\%$). Table 4 reports the number of hashtags included in the Facebook posts.

For the purpose of analysis, hashtags were considered popular if they appeared six or more times in the Facebook posts during the study’s time period: #sustainability, #usu, #recycle (including #recycling), #utah, #permaculture, #gardening (including #garden and #gardens), #earth, #water, #cleanair, #climatechange, and #meatlessmonday. Table 5 depicts these popular hashtags in the Facebook posts.

**Research Question 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. Boxplot inspection revealed outliers
Table 3  

*Frequencies of Post Characteristics of the USU Extension Sustainability Facebook Page*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>41</td>
<td>8.1</td>
</tr>
<tr>
<td>February</td>
<td>49</td>
<td>9.7</td>
</tr>
<tr>
<td>March</td>
<td>62</td>
<td>12.3</td>
</tr>
<tr>
<td>April</td>
<td>60</td>
<td>11.9</td>
</tr>
<tr>
<td>May</td>
<td>56</td>
<td>11.1</td>
</tr>
<tr>
<td>June</td>
<td>45</td>
<td>8.9</td>
</tr>
<tr>
<td>July</td>
<td>39</td>
<td>7.7</td>
</tr>
<tr>
<td>August</td>
<td>23</td>
<td>4.6</td>
</tr>
<tr>
<td>September</td>
<td>26</td>
<td>5.2</td>
</tr>
<tr>
<td>October</td>
<td>42</td>
<td>8.3</td>
</tr>
<tr>
<td>November</td>
<td>35</td>
<td>6.9</td>
</tr>
<tr>
<td>December</td>
<td>26</td>
<td>5.2</td>
</tr>
<tr>
<td>Post time</td>
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<td></td>
</tr>
<tr>
<td>Morning</td>
<td>343</td>
<td>68.1</td>
</tr>
<tr>
<td>Afternoon</td>
<td>161</td>
<td>31.9</td>
</tr>
<tr>
<td>Post day</td>
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<td></td>
</tr>
<tr>
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<td>89</td>
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<td>Tuesday</td>
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<td>Wednesday</td>
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<td>Thursday</td>
<td>95</td>
<td>18.8</td>
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<td>93</td>
<td>18.5</td>
</tr>
<tr>
<td>Saturday</td>
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</tr>
<tr>
<td>Sunday</td>
<td>21</td>
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<tr>
<td>Graphic</td>
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<td>256</td>
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<tr>
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<td>3</td>
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</tr>
<tr>
<td>No</td>
<td>501</td>
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<td>24</td>
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<td>70</td>
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</tr>
</thead>
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<td></td>
</tr>
<tr>
<td>No link present</td>
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</tr>
<tr>
<td>Link to internal site</td>
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<td>14.1</td>
</tr>
<tr>
<td>Link to external site</td>
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</tr>
<tr>
<td>Link to both internal and external site</td>
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<td></td>
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<td>Yes</td>
<td>4</td>
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</tr>
<tr>
<td>No</td>
<td>332</td>
<td>65.9</td>
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<td>62</td>
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</tr>
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<td>442</td>
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<td>332</td>
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<tr>
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<td>18.1</td>
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<td>Land</td>
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<td>Water</td>
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<td>4.8</td>
</tr>
<tr>
<td>Air quality and climate change</td>
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<td>12.3</td>
</tr>
<tr>
<td>Food</td>
<td>164</td>
<td>32.5</td>
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<tr>
<td>Energy</td>
<td>19</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**Table 4**

*Number of Hashtags in Posts on the USU Extension Sustainability Page*

<table>
<thead>
<tr>
<th>Number</th>
<th>$N$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>332</td>
<td>65.9</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td>3.8</td>
</tr>
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<td>56</td>
<td>11.1</td>
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<td>3</td>
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</tr>
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<td>5</td>
<td>7</td>
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</tr>
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<td>6</td>
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<td>0.0</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>
Table 5

*Popular Hashtags in Posts on the USU Extension Sustainability Page*

<table>
<thead>
<tr>
<th>Hashtag</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>#sustainability</td>
<td>94</td>
<td>18.7</td>
</tr>
<tr>
<td>#gardening, #garden, #gardens</td>
<td>20</td>
<td>4.0</td>
</tr>
<tr>
<td>#recycle, #recycling</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>#utah</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>#permaculture</td>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>#earth</td>
<td>11</td>
<td>2.2</td>
</tr>
<tr>
<td>#cleanair</td>
<td>9</td>
<td>1.8</td>
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<tr>
<td>#usu</td>
<td>8</td>
<td>1.6</td>
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<tr>
<td>#climatechange</td>
<td>8</td>
<td>1.6</td>
</tr>
<tr>
<td>#meatlessmonday</td>
<td>8</td>
<td>1.6</td>
</tr>
<tr>
<td>#water</td>
<td>6</td>
<td>1.2</td>
</tr>
</tbody>
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that were not a result of data entry or measurement error. Engagement rate by reach scores were assessed by visual inspection of Normal Q-Q Plots and histograms rather than the Shapiro-Wilk test for normality because the sample sizes are greater than 50 and would identify even minor deviations from normality as statistically significant (Field, 2013). The group sizes for the post characteristic variables were not equal group sizes, and Field recommends ignoring Levene’s test and read results from the SPSS data output row labeled equal variances not assumed.

The null hypothesis was retained that 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 nonstatistically 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 (Hodges’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 nonstatistically 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. Therefore, the null hypothesis was supported.

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 (Hodges’s $g = 0.94$). Therefore, the null hypothesis was rejected. There was a nonstatistically 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, and the null hypothesis was retained.

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, $M = -0.31, 95\% \text{ CI } [-0.51, -0.12]$, $t(75.05) = -3.17, p = .002$. This result had a medium effect size (Hodges’s $g = 0.47$), and the null hypothesis was rejected. Next, a null hypothesis was rejected because 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, $M = 0.15, 95\% \text{ CI } [0.03, 0.28]$, $t(331.22) = 2.43, p = .016$. Further, this result had a small effect size (Hodges’s $g = 0.24$).

The null hypothesis was that no significant difference exists between Facebook posts including a link to an internal site, posts including a link to an external site, posts containing both an internal and external link, and posts with no link on engagement rate by reach. The null hypothesis was tested using a Kruskal-Wallis H test. 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. The post hoc analysis 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), $p = .001$. 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. The null hypothesis was rejected.

A Kruskal-Wallis H test assessed the null hypothesis that no significant 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. The null hypothesis was rejected.

**Research Question 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 null hypothesis was that no significant differences existed between communicative functions on engagement rate by reach. To test this hypothesis, the Kruskal-Wallis $H$ test determined if there were differences in engagement rate by reach between the three communicative functions. The inspection of histograms boxplots revealed outliers that were not a result of data entry or measurement error. The kurtosis scores of 7.44 for informational messages and 14.75 for community messages were not surprising given the large sample size (Field, 2013). A kurtosis value of 1.24 for promotion and mobilization messages was a little positive. The
researcher did not use the Levene’s test to check the homoscedasticity/homogeneity of variance because of the large sample size (Field, 2013). Distributions of engagement rate by reach scores were similar for all groups as assessed by visual inspection of the boxplots. The null hypothesis stating no difference existed between groups on engagement rate by reach was retained. 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.

Research Question 4: What are the Differences Between the Types of Sentiment and Facebook Engagement Rate?

Analyzing sentiment can help determine the overall attitude and tone portrayed in Facebook posts, posted by page administrators, on the USU Extension Sustainability page. 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 retained the null hypothesis. No significant difference exists 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 Hodges’s g was 0.15.
Summary

The frequencies and percentages of post characteristics in USU Extension Sustainability posts were set forth. March was the most published month, and September and December experienced the least amount of posting. The majority of posts were published in the morning. Almost all posts were created by the organization. A link was the most common post characteristic, and almost half of posts included a graphic. Videos and text-only were the least common post characteristics. Water and energy were the least discussed areas of sustainability, while food was discussed in almost a third of posts. Hashtags were only included in a third of posts; however, when included the number of hashtags ranged from one to eight, with three being the most common number of hashtags in a post.

The differences between engagement rate by reach and post characteristics, communicative functions, and types of sentiment were set forth. Statistically significant characteristics linked to increased engagement included shared posts, posts containing video, and posts containing page mentions. Posts containing an external link experienced lower engagement than posts not containing any type of link. Posts published on Tuesdays experienced lower engagement than Friday posts. Post characteristics significantly linked to decreased engagement included the use of hashtags in posts. No significant differences between engagement rate by reach and communicative functions or types of sentiment was found.
CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

The theoretical framework for this study was based on uses and gratifications theory and supported by literature on social media marketing strategy. The conceptual framework was derived from existing literature related to organizations’ communicative functions of Facebook messages, post characteristics, sentiment, and the audience’s uses of Facebook. The findings of this study provide Extension professionals with information about consumer content preferences in eliciting engagement for Facebook posts. This chapter explains the results of the study and offers recommendations for future research.

Conclusions

Research Question One: What Characteristics Were Present In Individual Posts?

Examining individual post characteristics provides a frame of reference to what tactics, if any, were employed by the organization and which characteristics were not found on the USU Extension Sustainability Facebook page. The importance of these characteristics is discussed in connection with previous research and the results of this research study. Results are expounded on, and marketing recommendations are set forth for the administrators of the USU Extension Sustainability Facebook page.

Post month. While literature did not indicate any particular month being linked to increased engagement, the literature did stress the importance of Extension professionals remaining consistent with delivery methods when communicating about sustainability
The USU Extension Sustainability page posted much more frequently in the spring than the months of September and December. This may be due to external factors, such as the training of a new social media manager, or scheduled breaks of the organization when employees and page managers may be on holiday. Additionally, several sustainability-themed events and national holidays, such as Earth Day, occur in the spring which may provide more content for posting. USU Extension Sustainability was chosen for this study due to its consistent history of posting (USU Extension Sustainability, 2019b). However, the page could post more consistently throughout the year. Some months experienced over 60 posts, equating to over two posts a day in some cases. Pages with less than 10,000 followers should post one to two times a day to experience the most engagement (Social Report, 2018).

**Post time.** Posts were overwhelmingly published in the morning compared to the afternoon and evening. This is consistent with previous research stating the peak time for posting, in order to have the greatest chance of heightened engagement, is between 9 a.m. and 3 p.m. (Arens, 2019).

**Post day.** Overall, USU Extension Sustainability posted to Facebook more on the weekdays than the weekends. This practice is in accordance with previous research which recommends posting on weekdays (Arens, 2019). Conversely, Sundays typically experience the least engagement (Arens, 2019). Consistent with these findings, USU Extension Sustainability posted the least amount on Sunday.

**Post type.** 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 desire of the audience, gratifying their use of the platform (Maresca, 2018; Newberry, 2018; Sprout Social, n.d.; Weinberg, 2009). However, sharing posts can also fulfill needs if material is relevant. Additionally, this may foster a sense of community thus fulfilling the social interaction use of Facebook (Smith, 2017; Whiting & Williams, 2013).

**Graphic and text.** Posts that contain some sort of visual element, such as a video or graphic, experience higher engagement than text-only posts, according to previous literature (Chachere & Gibson, 2018; King, 2016; King et al., 2016; Maresca, 2018). The Facebook page for USU Extension Sustainability very rarely posted text-only content and is in accordance with previous literature recommendations. The page does post graphics regularly, which are also an effective engagement driver as suggested by social media marketing literature (Newberry, 2018).

**Video.** The USU Extension Sustainability Facebook page rarely posted videos, despite recommendations found in previous literature suggesting that video is a highly effective tool to increase engagement on Facebook (Barnhart, 2018b; Newberry, 2018). However, this finding is consistent with Bortree and Seltzer’s (2009) indication that video is a highly underutilized tool by organizations.

**Quote.** Quotes were used in less than 15% of Facebook posts posted by the organization. This is consistent with findings from Meyer et al. (2017) where approximately 10% of posts included a quote.

**Links.** Links were the most common post characteristic on the USU Extension Sustainability Facebook page. Posts with the link characteristic contained internal,
external, or both internal and external links. The majority of Facebook posts contained some sort of link. Maresca (2018) discovered links were rarely used by agricultural livestock show Facebook pages. However, Meyer et al. (2017) found embedded links were used in almost half of all posts. Literature varied widely on the amount of posts that contained a link, and the USU Extension Facebook page leans toward the more frequent use of links in posts.

**Location tag.** Very little information was available about the use of location tags in posts. Maresca (2018) studied the use of location tags and map locations for Facebook posts but found very little use of this feature. Repovienė and Pažėraitė (2018) also studied the use of location tag but did not report frequencies of location tags in posts. 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 may be posting content retrospectively or are not present at the actual location and are posting content provided by other sources, and therefore do not tag the location.

**Page mention.** Bramble (2019) and Sukhraj (2017) recommend sharing or mentioning content produced by followers and fans to create a sense of community on the page, which may lead to increased engagement by followers. Additionally, tagging other pages in the message allows the post to appear before a larger audience (Smith, 2017). The USU Extension Sustainability Facebook page infrequently mentioned other posts, potentially missing out on a chance to use the Facebook page as a community-building
tool.

**Use of hashtags.** Variation in the use and number of hashtags ranged in the literature depending on the type of page and manager preferences (Maresca, 2018; Meyer et al., 2017). However, both Maresca (2018) and Meyer et al. (2017) discovered the Facebook pages used branded hashtags that were utilized by other pages 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. Surprisingly, the hashtag of the parent organization, #usuextension, was not used in a single post. This may indicate a branding issue if USU Extension administrators desire a unified voice for the overarching USU Extension organization on online media. Ayers (n.d.) and Meyer et al. (2017) recommended using no more than two hashtags. If a hashtag was used, the mode was three for a USU Extension Sustainability post; however, up to eight hashtags were used in a single post. Most posts contained three or less hashtags, consistent with previous literature recommendations (Ayers, n.d.; Meyer et al., 2017).

**Areas of sustainability.** Unique to the USU Extension Sustainability Facebook page was a mission to deliver information on five areas of sustainability: land, water, air quality and climate change, food, and energy. The page was inconsistent with evenly distributed posting for each category, with the most posts portraying food-related topics and only a small amount of posts dedicated to water and energy topics. This may indicate that the social media manager has content preferences to certain areas of sustainability and is not providing equal real estate to each topic on the organization’s timeline. This
finding also points to a need to discuss areas of sustainability that Extension educators had believed were being adequately addressed or, perhaps, an aversion to issues that are politically charged or “hot button” topics exists (Brain & Dove, 2017).

**Research Question Two: What are the Differences Between Individual Post Characteristics and Facebook Engagement Rate?**

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. An understanding of the differences between the individual post characteristics and Facebook engagement provides valuable information regarding which characteristics may be more influential than others. This may lead to knowledge about possible ways to influence engagement on USU Extension Sustainability Facebook posts. The influence of these characteristics is discussed in connection with previous research and results are expounded upon.

**Post time.** There was no significant relationship between the time the post was published to Facebook and the post engagement rate by reach. Arens (2019) recommends posting between 9 a.m. and 3 p.m., however, morning and afternoon posting times did not appear to have any relationship with overall engagement of the post.

**Post type.** The originality of the post, whether the post was created by the organization or shared from another Facebook page, had a statistically significant relationship with engagement rate by reach. Shared posts experienced slightly higher engagement than 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 (Beattie et al., 2019; Maresca, 2018; Meyers et al., 2015; Meyers et al., 2011). Additionally, shared content may promote a sense of community, which may lead to increased engagement (Bramble, 2019; Sukhraj, 2017).

**Graphics.** Graphics were not found to be statistically significantly related to engagement rate by reach in this study. This finding is surprising as previous literature has consistently indicated a relationship (King, 2016; Meyer et al., 2017; Newberry, 2018; Repovienė & Pažėraitė, 2018). Graphics were included in approximately half of the posts created by the organization, which is consistent with this recommendation. However, graphics must appeal to the desired uses of an audience, such as providing relevant information or entertaining followers, and simply including a graphic may not be enough gratification for followers to engage with the post.

**Videos.** 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, almost a decade previous, that video is a poorly underestimated and underused resource to drive audience engagement. Additional literature also indicated that using a video provides a post a greater chance for heightened engagement (Barnhart, 2018b; Newberry, 2018; Repovienė & Pažėraitė, 2018).

**Quote.** There was no statistically significant relationship between the use of a quote and post engagement rate by reach. Previous research suggests that quotes can help
drive engagement if used appropriately and strategically (Bunskoek, 2013; Hutchinson, 2015). The findings from this study indicate that a quote has little to no relationship with engagement and, therefore, does not aid or hinder engagement on the post. However, using a quote may fulfill other purposes such as creating a sense of community for followers (Bunskoek, 2013; Hutchinson, 2015).

**Page mention.** Previous research indicated that tagging other pages by mentioning those pages in the message of the post may increase engagement (Smith, 2017). 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). Additionally, tagging other pages causes the post to appear on the USU Extension Sustainability page and the page of the organization or person mentioned in the post. This provides farther reach and allows for greater chance of engagement.

**Hashtags.** Posts not containing hashtags experience a slightly higher engagement rate by reach. This is inconsistent with previous findings. Kissane (2015) indicated that the use of hashtags can help drive engagement. Repovienė and Pažėraitė (2018) found that the number of hashtags was statistically significantly 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. This statistically significant finding agrees with other literature stating that engagement may suffer when higher numbers of hashtags are used (Ayres, n.d.). Posts that did include hashtags included anywhere from
one to eight hashtags, with three being the most common number of hashtags. This 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 finding.

**Link.** 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. However, there were no statistically significant results determining a relationship between engagement rate by reach and posts containing an internal link, or posts containing both an internal and external link. The use of these links in Facebook posts created by the organization 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.

**Post day.** Although there were significant differences in distribution of engagement for Tuesday posts compared to Friday, there were no statistically significant findings indicating that engagement rate by reach scores differed based on other post days. The USU Extension Sustainability Facebook page has several longstanding campaigns. These campaigns include Tip Tuesday, Waste Free Wednesday, and Permaculture Friday. Differences in engagement scores on these days may be based on the popularity of the content shared as part of these campaigns. Additionally,
Permaculture Friday typically included a graphic of some type, a characteristic indicative of increased engagement (Newberry, 2018).

Arens (2019) recommended that posting on weekdays provides posts the highest chance of increased engagement, rather than posting over the weekend. Arens (2019) gave the example of Wednesday as an optimal posting day. Consistently posting one or two times throughout the day on weekdays may be more important than the specific day of the week a message is posted (Social Report, 2018).

**Research Question Three: What are the Differences Between the Communicative Functions and Facebook Engagement Rate?**

According to uses and gratification theory, an audience uses social media for specific purposes (Whiting & Williams, 2013). Conversely, an organization sends media messages that achieve one of three functions for the audience: information seeking, community-building and dialogue, and promotion and mobilization. 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 (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 informational transfer purposes, this function is the least engaging of the three functions
according to previous literature (K. 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 in prior research (King et al., 2016; Saxton & Waters, 2014), this finding indicates a disconnect between the research, as well as the purpose of Facebook, and actual posting practices by an organization.

The community-building and dialogue function encourages engagement by followers and fulfills the purpose behind the Facebook platform, aiding in the overall placing of the post by the Facebook algorithm that helps posts travel further to diverse and expanding audiences (Mosseri, 2018). The community-building and dialogue function also creates a sense that the audience should take an active role in sustainability efforts (Carpenter et al., 2016). 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. However, despite previous literature, this study determined there was not a statistically significant relationship among functions in relation to engagement rate. This finding was surprising but suggests that the communicative function present in each post does not aid or discourage Facebook engagement for USU Extension Sustainability.

**Research Question Four: What are the Differences Between the Types of Sentiment and Facebook Engagement Rate?**

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, analyzing sentiment can help determine if this goal is related to engagement.

Findings determined that the vast majority of posts portrayed neutral sentiment, followed by positive sentiment. Negative sentiment was rarely detected in the posts. This finding would suggest that, overall, posts are meeting the goal of the page. This supports recommendations from other literature indicating a need to discuss similar issues in a positive, uplifting manner (Steede et al., 2018).

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. However, this does vary from Maresca’s (2018) findings who discovered that although negative sentiment was rarely used in Facebook communication regarding national stock shows, negative posts by activists regarding animal welfare issues, a hot button issue, elicited high engagement in certain instances. 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 little amount 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 the organization.

Recommendations

Recommendations for Research

Researchers should examine Facebook engagement in other Extension Facebook pages and compare results to this study. Additionally, other variables should be considered in future studies. First, the demographics of followers should be assessed in relation to their interactions with content on the page if Facebook will release the demographic information for individual posts in the future. This may provide valuable insight into the audience of the message and how this can affect the engagement of posts. It may also indicate consumer content preferences in relation to the demographics of followers. Also, future research should study the post time in a range of times rather than AM and PM variables to provide more specific guidelines of when to post. Emojis were not included in this study, but future research should focus on whether the inclusion of emojis and the frequency of emoji use impacts user engagement on posts. Facebook includes an option to boost posts monetarily to improve engagement. Future research can dive into the differences between organic and paid posts on engagement.

Organizational response should be studied to determine if the involvement of page administrators with followers has any relationship with the engagement on Facebook posts. Similarly, 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.

This study used Facebook engagement rate by reach for the dependent variable. Further research should focus on different dependent variables to measure engagement, such as the number of likes, comments, and shares on a post. This can provide a clearer understanding of what engagement was experienced on individual posts.

Additions to this study should include a qualitative approach, such as interviews or focus groups, 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. It may also identify significant variables not included as part of this study.

Perceived changes in knowledge and attitude, along with behavior change, of participants as a result of interaction with the USU Extension Sustainability Facebook page should be studied. This may be done by posting a survey to the USU Sustainability Facebook page to gather information from the followers. This information can help researchers determine if Facebook messaging is affecting consumers in a desired manner and achieving the goals of the land-grant institution and the research priorities of the American Association for Agricultural Education in discovering effective methods to communicate with a diverse audience and facilitate sustainable behavior.

Additionally, this study lacked a control group and was largely descriptive in nature. An experimental design is needed to truly determine any differences among groups exposed to specific Facebook posts that include the characteristics that are found
to increase engagement rate by reach and posts without. This can help Extension administrators determine if they are truly moving the needle in terms of public education.

The further exploration of how Facebook can be used as an educational tool should be conducted. This research can provide new insight in how to best utilize the platform in new and engaging ways in order to stay relevant in the ever shifting and adapting world of social media. For example, page administrators did not utilize Facebook live, a live video streaming tool available on Facebook, and therefore this tool was not examined as part of this study. Other USU Extension pages are utilizing this option to teach specific skills and impart knowledge to followers. Future research can explore this tool and determine if it is an effective way to disseminate information to followers in an impactful manner.

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 static websites, in order to stay relevant. Google Analytics and other big data sources may be used as powerful tools to determine traffic flow and audience behavior when browsing a topic.

**Recommendations for Practice**

Page administrators of the USU Extension Sustainability Facebook page should incorporate the following suggestions into the marketing strategy for the page in order to potentially increase engagement, thus better reaching a diverse audience through a non-traditional communication method.

First and foremost, the shift to social media, and purpose of Facebook, is to create dialogue and community between stakeholders and an organization, thus fulfilling the
two-way interactivity purpose of social media marketing (Mosseri, 2018; Weinberg, 2009). Although no statistical significance was discovered in the differences between the communicative functions and Facebook engagement rate, previous literature strongly indicates a need for more community-building and dialogue messages in Facebook communication, and this information should not be discounted (King et al, 2016; Meyer et al, 2017). The information seeking function is widely used by USU Extension Sustainability, which is helpful and necessary, but fostering a sense of community and bringing people closer together is the purpose of Facebook (Mosseri, 2018) and may have additional positive impacts outside of increased engagement. This can be done by adhering to the following suggestions.

Administrators of the USU Extension Sustainability Facebook page should use the Facebook sharing option to highlight relevant content from other Facebook pages when appropriate as this may lead to a greater sense of community and increased engagement on the page. Currently only very few posts are shared by the organization, however, findings indicate that shared posts are significantly related to increased engagement on the organization’s Facebook posts. Pages such as the Utah Department of Environmental Quality, Utah Department of Agriculture and Food, and the Utah Division of Water Resources may act as influencers and post relevant content that can be shared by USU Extension Sustainability.

Tagging pages in posts in the form of page mentions may foster a sense of community among followers of sustainability-related pages and followers of the USU Extension Sustainability page. Additionally, findings from this study indicate that posts
containing page mentions experienced higher engagement than posts without. Page
administrators may consider networking with other sustainability or similar Extension
pages to share content and act as influencers for audiences engaged with pages that have
similar purposes. This can help diversify the audience and improve the overall reach and,
ultimately, the engagement of the post (Newberry, 2019b).

Although no statistical significance was found involving engagement rate
between Facebook posts containing a quote and posts without, perhaps due to the small
sample size of posts containing a quote, this characteristic can help create a sense of
community and fosters a positive connection with other organizations, entities, and ideas
(Bunskoek, 2013; Hutchinson, 2015). The USU Extension Sustainability Facebook page
may continue to employ this tactic in Facebook messaging. However, quotes should
pertain to the overall purpose of the page and resonate with the audience, otherwise the
quotes may come off as annoying or irrelevant (Hutchinson, 2015).

The USU Extension Sustainability page currently posts great content and images
taken at sustainability-related locations throughout Utah and the country. Using location
tags to “check in” at these places may be an interesting tool that allows followers to
connect with the location and build a sense of community. This can be especially useful if
team members are in specific locations that may be meaningful or interesting to
followers, such as permaculture gardens in other states or certain areas of Utah where
followers reside and may have the opportunity to visit in the future.

Page administrators of the USU Extension Sustainability Facebook page may seek
to include external links in order to create a feeling of “we’re all in this together,”
although external links are associated with lower engagement. Using resources from other organizations may help followers feel that sustainability is an issue that is being taken seriously by other community organizations.

If posing a question, a tactic that may start community dialogue, page administrators should avoid using yes/no or rhetorical questions, but instead ask open-ended, unbiased prompts that encourage open and honest discussion in a safe environment. This may provide a channel for followers to express their true beliefs and provide educational and community-building opportunities.

Continuing to actively engage and respond to followers ought to be a goal of page administrators of the USU Extension Sustainability Facebook. Not only may this affect engagement, but it can create a relationship between the organization and Facebook followers, thus fulfilling the two-way interactivity purpose of social media (Bortree & Seltzer, 2009; Kent et al., 2003; King et al., 2016; Meyer et al., 2017).

All Facebook pages should have SMART goals for posting and page growth. For the USU Extension Sustainability Facebook page, it is recommended to set engagement goals for posts, as well as overall page growth determined by the number of likes and followers on the page. Goals should be evaluated periodically to ensure that progress is being made toward achieving the goal within the set time frame.

The current goal listed by the institution is to post messages in five thematic areas: land, air, food, energy, and water. If the page aims at providing information about all five areas of sustainability, then each area should receive a comparable distribution of posts. This will ensure that education about each area is being attempted through
Facebook messaging and will expose followers to more diverse messaging about important areas that are currently getting little dedicated space on the page. Sustainability areas discussed more heavily on the page should be those that have been indicated as “weak areas” by Extension personnel (Brain & Dove, 2017). Certain times of the year may cater toward different areas of sustainability, such as discussing air quality and climate topics during bad inversion days for some areas of Utah in the winter. This practice ties into a sustainability-related topic that is already on people’s minds, providing an opportunity and platform for followers to share their thoughts about the issue, engaging with - and learning from - each other and the page.

Some areas of sustainability may be more controversial than others. However, shying away from difficult conversations that may produce negative audience sentiment may avoid having important and relevant conversations with Extension’s target audience. However, the organization should continue to fulfill its goal of providing uplifting, positive messages to the public. Due to the organization’s ties to an educational institution, this is appropriate in order to maintain the image and professionalism of the university. Page administrators can seriously consider continuing the practice of providing uplifting and positive messages to the public, which may impact overall attitude toward sustainability topics and organizations.

In addition to building community and encouraging dialogue, the USU Extension Sustainability page should seek to illicit engagement by creating value for the stakeholder, drawing on the purpose of social media marketing and uses and gratification theory (Felix et al., 2017; Whiting & Williams, 2013). This can be done by creating
strategic, purpose-driven, and consistent content that meets the needs of users and fulfills their purposes for visiting the Facebook platform and following or liking the USU Extension Sustainability page.

Page administrators are currently doing an excellent job of posting visual content to the page in the form of graphics. However, findings indicate the page rarely posts videos, a tool that has a statistically significant relationship with heightened engagement. Page administrators may consider seeking out or creating appealing videos that are relevant and appropriate to the purpose of the page and share these videos with followers of the page. Additionally, Facebook administrators can utilize Facebook live to engage with followers in real time and capitalize on the favorability of the algorithm for this type of content as it promotes a sense of community and interaction (Mosseri, 2018). Facebook live may also provide an ideal opportunity for page managers and administrators to educate and share interesting information with followers about sustainability topics.

Page administrators need to post more consistently throughout the year as time and resources allow. This will ensure that followers are receiving consistent messaging and can expect a certain level of activity by the organization. Page administrators should continue posting consistently and seek to post one to two times a day during the week (Social Report, 2018). Winter is a prime time to discuss air quality issues in Utah, and creating content related to this sustainability theme may be a very timely conversation to engage followers with the page. Page managers may schedule posts during times the institution is not in session, such as holiday breaks, due to its nature as an academic
Currently, the organization is doing a commendable job tying into sustainability-related holidays such as Earth Day or Arbor Day. The organization should continue this practice as it ensures posts are relevant and timely, as well as this practice may provide an opportunity to build community around a celebration. Posts should be published on weekdays rather than weekends whenever possible, unless scheduled for a holiday.

Hashtag use by the organization lacked strategy and consistency. If hashtags are used, and findings indicated that posts not containing hashtags experienced higher engagement, then the number of hashtags needs to be kept to two or less. Additionally, hashtags should only be included if they have a clear purpose. For example, a currently trending hashtag may be used if a timely post is made on the subject as this may draw in new viewers who are interested in seeing posts containing that hashtag. Hashtags may also be used for branding purposes, such as #usuextension, to indicate a partnership or affiliation with the parent organization. A branded hashtag used consistently may aid the organization. However, hashtags contrived by the page administrators that are not regularly used should not be included in posts. Further research should be conducted by page administrators to determine which hashtags are popular for certain topics. The hashtag #sustainability is a very popular hashtag on Facebook (Best Hashtags, 2019) and was often used by the organization. However, this hashtag is popular nationwide and may draw in readers not specific to USU Extension Sustainability’s target audience. Hashtags specific to Utah may help draw in current residents.

Offering incentives and contests, if done strategically while providing value to the
follower, may help increase engagement on the page and create a fun atmosphere. However, Facebook has become increasingly payment-driven in order for organization and business pages to break through barriers and push content out to a wider audience. Boosting posts may help push contest posts outside the realm of traditional followers, providing more success and drawing in new followers to the page.

As social media is ever-changing, USU Extension Sustainability should monitor additional platforms and tools, such as Instagram or the organization’s static site, to determine where the organization’s target audience spends time. Efforts should be made to determine if these platforms would be a successful engagement tool between the organization and its target audience while fulfilling the goals of USU Extension Sustainability. Additionally, USU Extension Sustainability should include some type of driver from the static site to its social media channels in order to engage followers from the site in conversations on the platform and keep them regularly connected with the organization. The organization may also utilize website resources such as factsheets to post on the Facebook page in order to cross-pollinate content.

Overall, the institution is doing an excellent job of communicating with followers. The overall average engagement rate by reach of all types of posts in the U.S. is 3.75% (Kemp, 2019). The USU Extension Sustainability Facebook page regularly had posts that exceeded an engagement rate of 20%. With some minor adjustments to the page’s social media strategy, the organization has the potential of fulfilling Extension’s goal of engaging a diverse public on difficult sustainability topics through the platform.
Summary

This chapter reviewed the study’s findings, derived conclusions and provided interpretation to the findings, and compared the results of this study with previous literature. Key recommendations for future research include the following.

- Reiterations of the study with other Extension Facebook pages and the inclusion of additional variables such as demographic characteristics of followers and emoji use by the organization.
- The need for qualitative studies to delve deeper into audiences’ attitudes, intentions, and perceptions.
- Research focused on behavior change as a result of Facebook communication for Extension programs.
- Experimental studies to determine the existence of a treatment effect between posts containing significant characteristics and those without.

Marketing suggestions were proposed to administrators of the USU Extension Sustainability Facebook page. Page managers should post more videos and use Facebook Live to drive engagement and interact with page followers in real-time. Other key suggestions include the following.

- Posting to the page once or twice a day, on weekdays, throughout the year, tying into relevant holidays when possible.
- Setting SMART goals and evaluating metrics to ensure progress through Facebook communication.
- Seeking to build community through the use of characteristics and communicative functions to encourage dialogue and two-way interactivity between the organization and its followers.

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.
REFERENCES


Ken, D. (2014). *Why engagement rate is more important than likes on your Facebook.* Retrieved from https://www.socialmediatoday.com/content/why-engagement-rate-more-important-likes-your-facebook


CODEBOOK

Basic Instructions:
1. Open the Google Sheet that is your code sheet for the project.
2. Click on the permalink for each Facebook post. It is beneficial to log into your Facebook account to view the post.
3. Read each Facebook post completely.
4. Read each Facebook post a second time. This time you will pay attention for the existence of the listed variables. As you find the variables, you mark your codes for the variables on the row in the code sheet assigned to that Facebook post.

The definitions and codes of variables are as follows.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Directions and Descriptions</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post month</td>
<td>Record the month of the post: January (1), February (2), March (3), April (4), May (5), June (6), July (7), August (8), September (9), October (10), November (11), December (12).</td>
<td>Post Created by Organization</td>
</tr>
<tr>
<td>Post day</td>
<td>Record the day of the week of the post: Monday (1), Tuesday (2), Wednesday (3), Thursday (4), Friday (5), Saturday (6), Sunday (7).</td>
<td></td>
</tr>
<tr>
<td>Post type</td>
<td>If post is created by the organization, record 1. If the organization shares a post created by someone else, record 0.</td>
<td></td>
</tr>
</tbody>
</table>
Post Created by Someone Else

Text

If text is the only content in the post, record 1, if not 0.
A graphic is any visual aspect other than a video that is present, including an illustration, photo, logo, GIF, infographic, meme, flyer, or brochure. If a graphic is present, record 1. If there is no graphic, record 0.
Infographic

Biking is an excellent alternative form of transportation. Check out our infographic to find out why!

**Why Bike?**

4 Reasons Why Biking is a Great Alternative

**Convenience**

Bicycles can help save time and money by combining commuting and exercise. As well as finding non-clogged routes via bike lanes and not having to search and pay for parking.

**Economics**

It is more than 40 times more expensive to operate a vehicle than a bicycle, not including the cost of the vehicle itself.
Flyer

Discover and sample a range of campus edibles such as apricots, plums, strawberries, and more! Come join us on July 27th from 9am-12pm at the USU Logan Permaculture Garden for an amazing tour!

Intergenerational Audubon Society Utah State University Extension Nora Eccles Harrison Museum of Art, Utah State University

USU EDIBLE LANDSCAPE TOUR & ART ROCKS! MANDALA PAINTING
TOUR: 9AM - MANDALA PAINTING: 10AM - 2PM
An educational and fun opportunity to explore the ease and availability of edibles on the USU campus! Discover and enjoy a range of campus edibles such as apricots, plums, strawberries, edible plants, native plants, and city edible plants. No previous experience necessary. Urban and rural edible plant tours are offered separately.

Saturday July 27, 9am-12pm
USU Logan Permaculture Garden: 停车 Area off of 200 W.

Video

If a video or livestream video is present, record 1, if not 0.
Quote If a quote is posted, record 1, if not 0.
| Link                     | Record if the link directs to an internal or external website or page. Internal websites are those managed by the organization, including USU Extension Sustainability. External websites are any pages the organization does not manage. You might need to hover your mouse over the link or click on the link to see if it is an internal site or external site. Record:
|                         | 0 = no link is present
| Link to Internal Site   | 1 = link to an internal site belonging to USU, USU Extension or USU Extension Sustainability
| Link to External Site   | 2 = link to external site
|                         | 3 = link to both an internal site and an external site |
| Location tag | 0 = no tag is present  
1 = location is tagged |
|---|---|
| Page mention | The post includes a page’s name within the text. The name is a blue link to that page.  
0 = no mention is present  
1 = another page is mentioned |
| Hashtag | Look for the hashtags within the post text or at the end of the post.  
0 = no tag is present  
1 = hashtag is used |
| Hashtag number | Record the number of hashtags present in the post. |
| Hashtag examples | Write any hashtag(s) used in the post. Look for the hashtags within the post text or at the end of the post. If more than one hashtag is used in the post, separate them with a comma. Examples of hashtags include #BeatAirPollution, #TipTuesday, or #sustainableprograms. |
| Areas of sustainability | Record the area of sustainability: land (2), water (3), air quality and climate change (4), food (5), and energy (6). If area is not applicable, record 0. If you can’t identify an area of sustainability, record 1. Not applicable – Holiday announcements, job postings, or promotion of organization’s other social media platforms not related to one of the areas of sustainability. |
Not identifiable – If you can’t identify an area of sustainability, record 1.

Land – Green buildings and development, land conservation, composting, pollution, as well as ways to reduce, reuse, and recycle.
Water – Water conservation (including water-wise landscaping) and water quality.

Air quality and climate change – Air quality (including Utah’s inversions and Particulate Matter 2.5) and climate change (including global warming). Also includes any general biking references, may use the term “carbon footprint,” or discusses alternative transportation.
Food – Gardening, eating local, beekeeping, permaculture, food justice, and food waste.

<table>
<thead>
<tr>
<th>Sentiment</th>
<th>Sentiment refers to a feeling, which can imply a positive, neutral or negative feeling. When you read the post, consider the words, emoticons, punctuation, and context of the information.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive  sentiment</td>
<td>If the post contains positive sentiment by using words such as <em>good</em>, <em>wonderful</em>, and <em>amazing</em>, indicative of a positive opinion, record 1.</td>
</tr>
<tr>
<td>Neutral sentiment</td>
<td>If the post contains neutral sentiment by expressing neither a positive nor negative opinion, record 2.</td>
</tr>
</tbody>
</table>
If the post contains negative sentiment by using words such as bad, poor, and terrible, indicative of a negative opinion, record 3. Be cautious in differentiating attitude from the overall context. For example, a post could refer to poor or bad air quality and the need to change behavior to improve the air. This does not necessarily represent negative sentiment.

Images that contain text can be included for coding communicative functions if you can see the content it provides without clicking on it. If the communicative function is not identifiable, record 0.

The information function involves one-way interaction with the organization exchanging information to its followers. The Facebook post could include links to other sites where additional information could be found. Record 1 if the post contains information about:
- The organization's activities, services and programs, or history
- Highlights from events
- Reflections of the vision, mission, or objectives
- News, facts, reports or information relevant to an organization's stakeholders
- Information on plants, bees, and other sustainability topics
- Reports on finances, performance, policies, or ethical standards to boost accountability and trust
- Specific date, not including a colloquial such as "around the corner"
- Sharing an anecdote
- Uses verbiage such as “for more information” or “find out more” to direct followers to other resources
Record 2 if the post serves to interact, share, and converse in a way that ultimately facilitates the creation of an online community. Deepens, builds, and strengthens ties to the online community without involving an expectation of interactive conversation.

- Inclusive language and verbs
- Giving recognition and thanks
- Acknowledgment of current and local organization-related events
- Responding to public reply messages
- Response solicitation (explicitly seeking a response by including a poll/survey/contest, asking direct questions to followers, requesting to share, or asking for a reply or comment)
- Enabling such as providing resources and suggesting to use them together
- A sense of "we're in this together"

Holidays – recognition of holidays (e.g. Thanksgiving, New Year’s Day, Fourth of July, Memorial Day, Merry Christmas, Happy Halloween)

Action

Record 3 if the post explicitly tells the reader what to do, know, and/or feel. Tools such as hyperlinks and hashtags are frequently used in conjunction with mobilization messages. It is less about creating dialogue than it is about mobilizing resources and supporters to get the followers to “do something” for the organization.

- Promoting an event (encourage participation in an event)
- Donation appeals (asking for donations in the form of goods or money or asking followers to support companies or organizations that support USU Extension Sustainability’s agenda)
- Selling a product
- Call for volunteers and post jobs for employees for Utah State Extension Sustainability or other organizations
- Lobbying and advocacy
- Join another site or vote for organization
- Learn how to help (request followers to take action by doing something that supports the organization’s purpose. For example, using leftovers in another meal, planting a garden, carpooling to work, riding a bike to work, using a reusable mug, etc.)
- Suggests followers “try” to do a requested action
- Media action – followers are asked to share or like the post on social media
- Viewing action – messages used verbs such as “learn,”
“read,” “visit,” or “watch” to ask the followers to read articles, see photos, visit a website, or view a video. The phrases “for more information” or “find out more” are indicative of providing an informational resource and are not a viewing action.