Investigating How Scientists' Enjoyment, Knowledge, and Skills Influence their Use of Social Media as Avenues for Science Communication

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Introduction

Under Research Priority One in the American Association for Agricultural Education's 2016–2020 National Research Agenda, which has been extended through 2023, Roberts et al. posed the question, *What methods, models, and programs are effective for informing public opinions about agricultural and natural resources issues?* Since 2016, scholars have identified social media as effective methods for communicating about agriculture and natural resources (Hawley et al., 2018; Steede et al., 2020). In general, however, scientists have been slow to adopt social media as avenues for science communication (Opat et al., 2021). Therefore, it is critical to determine how certain factors influence agricultural scientists' social media use so that we can develop training strategies to encourage and promote their use of such media.

Theoretical and Conceptual Frameworks

Through the lens of Ajzen's (1991) theory of planned behavior, science communication is a planned activity in which scientists choose to participate (Besley et al., 2018). There are three predictors that determine one's engagement in an activity—attitudes (e.g., enjoyment), subjective norms (e.g., institutional support), and perceived behavioral controls (e.g., skills; Ajzen, 1991). In 2017, Baram-Tsabari and Lewenstein modeled six science communication learning goals, each of which contain objectives that characterize someone who has learned science communication. Objectives associated with the *affective* learning goal describe scientists' interest and enjoyment in science communication and, therefore, measure their attitudes (Ajzen, 1991; Baram-Tsabari & Lewenstein, 2017). Objectives associated with the *methods* learning goal describe the skills scientists need to engage effectively with diverse audiences and, therefore, measure scientists' perceived behavioral controls (Ajzen, 1991; Baram-Tsabari & Lewenstein, 2017). For the purpose of our study, we developed a survey instrument using the science communication learning goals model to determine how certain attitudes and perceived behavioral controls influence scientists' use of social media for science communication (Ajzen, 1991; Besley et al., 2018). We sought to answer one research question: 1) What is the association between scientists' use of social media and their enjoyment in science communication, science communication content knowledge, general communication skills, media skills, and ability to self-reflect on science communication?

Methods

Similar methods may appear elsewhere because this study is part of a larger research project. Using Dillman et al.'s (2014) recommendations for web-based survey distribution, we emailed the survey instrument to science faculty in the colleges of agriculture, engineering, geosciences, science, and veterinary medicine and biomedical sciences at [University] (N = 1,755). We achieved a 15.16% response rate with n = 266 usable responses. Respondents predominantly identified as White (n = 192; 72%) males (n = 155; 59%) who were tenured (n = 148; 63%). In addition, 47% (n = 121) of respondents were scientists in the college of agriculture. We used

Pearson product-moment correlations to examine the association between scientists' use of social media for science communication and certain attitudes and perceived behavioral controls.

Results

We found low, statistically significant, positive correlations between scientists' social media use and the variables of interest (see Table 1; Davis, 1971). Scientists who greatly enjoyed science communication were significantly more likely to use social media to communicate science. In addition, as their amount of science communication content knowledge increased, so did their use of social media. Scientists' perceived skills also influenced their social media use. As scientists perceptions about their general communication skills increased (e.g., create messages that meet the public's needs and wants; convert complex ideas into understandable concepts for the public; facilitate public discussions), so did their use of social media for science communication. Similarly, as scientists perceptions about their media skills increased (e.g., how to write clearly for public media; how to produce digital media; how to create social media content and manage social media platforms), their use of social media also increased. Finally, the more scientists could reflect on themselves as science communicators (e.g., I am aware of the difference between providing information and acting as an advocate; I feel responsible for my own learning about the science communication process; I know my strengths as a science communicator), the more they used social media for science communication.

Table 1

Pearson R Correlation Coefficients Representing the Strength of Association Between Scientists' Social Media Use and their Enjoyment, Knowledge, General Skills, Media Skills, and Ability to Self-Reflect on Science Communication

Activity	Variables				
	Enjoyment	Knowledge	General Skills	Media Skills	Ability to Self-Reflect
Social Media Use	.19**	.15**	.22**	.26**	.16*

Note. ** $p < .01$; * $p < .05$

Conclusions and Recommendations

Social media are effective and far-reaching methods agricultural scientists can use to publicly communicate about agriculture and natural resources. Therefore, it is important to determine how we can promote their use of social media. Our results suggest that scientists' enjoyment, knowledge, skills, and ability to self-reflect on science communication significantly and positively influenced their use of social media for science communication. Therefore, communication training opportunities for agricultural scientists should focus on increasing their enjoyment in science communication, improving their science communication content knowledge, and, most importantly, developing their general communications and media skills. To further identify science communication training needs of agricultural scientists, future research should investigate which social media platforms they use most often to communicate and the quality and public engagement associated with the content they produce.

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