

Introduction

Graduate recruitment is a nuanced process, often segmented by professional versus research degree students (Chen, 2008), international versus domestic students (Archer et al., 2010), and a myriad of other student characteristics including marital status, age, career goals, and cultural preferences (Pooch & Love, 2001; Shellhouse et al., 2020; Srivastava et al., 2010). Therefore, recruiting graduate students into colleges of agriculture (COAs) requires strategic communication to serve all audience segments. However, strategic communication is often not addressed due to a lack of university resources devoted to creating and implementing recruitment strategies (Balayan et al., 2022). Interpersonal communication with prospective faculty advisors or current graduate students is considered critical to graduate student decisions to enroll in a program (Byrd & Lamm, 2025; Huang & Bilal, 2019). Online asynchronous communication tools are also influential in the graduate program search process, but many studies examining this process have been largely qualitative in nature (Byrd et al., 2023; Huang & Bilal, 2019; McNicholas & Marcella, 2022; Shellhouse et al., 2020). These tools require further examination to generalize findings and assumptions regarding prospective graduate students' communication preferences, specifically when searching for programs within COAs. Additionally, with a lack of resources attributed to graduate recruitment (Balayan et al., 2022) and a dearth of time for university faculty to devote to public-facing scientific communication (Washburn et al., 2022), there is a need to focus on asynchronous online tools which can be broadly employed across colleges to increase the efficacy of online communication with prospective graduate students through tools such as departmental websites, lab websites, and social media (Byrd & Lamm, 2025).

The usability of university websites has been the focus of much research, with most studies surrounding university website usability identifying issues of site navigation, design, user interaction, and a lack of quality information (Yerlikaya & Onay Durdu, 2017). Therefore, multiple frameworks have been created to evaluate site usability through measures ranging from "content, organization, presentation and interaction and trustworthiness" (Eldrandaly et al., 2023, p. 179) to "functionality", "usability", "reliability", "presentation", "and content" (Devi & Sharma, 2016, p. 236). However, the usability of graduate program websites has drawn less attention in comparison to overall university websites. More than 20 years ago, Pooch and Lefond (2003) sought to delve into students' experiences with graduate school websites through a quantitative survey and a series of focus groups. Findings revealed participants valued information about graduate programs, navigability, organization, and ease of accessibility for application information (Pooch & Lefond, 2003). However, they did not value site graphics (Pooch & Lefond, 2003). The information participants sought was primarily focused on how to apply, funding opportunities, course/program descriptions, and research focus areas of faculty members (Pooch & Lefond, 2003). Qualitative responses from participants indicated clean, simple, and intuitive web design was important to them in a credible, quality graduate institution (Pooch & Lefond, 2003).

However, the use of websites and the preferences thereof may have changed over the past two decades. Therefore, more recent studies have conducted content analyses of graduate program websites or attempted to increase user-focused web designs for graduate programs (e.g., Jahn et al., 2015; Rios et al., 2019). To increase enrollment in a Master of Science (M.S.) program, Jahn et al. (2015) suggested the creation of personas to understand the needs of users when accessing a site, therefore, building it with user needs in mind. By constructing the site

with the prospective M.S. students in mind and subsequently conducting a usability evaluation, Jahn et al. (2015) found the existing site was confusing for prospective students who did not have familiarity with the department or jargon of the program. They edited the site to be more usable for the students and achieved positive results. However, Jahn et al. (2015) recognized temporal and resource limitations in designing web pages for graduate departments. They identified the most crucial elements in a site redesign as 1) replacing text with graphics, 2) creating consistent formatting, and 3) including information about specific focus areas within the department along with how pursuing these areas could help prospective students obtain specific careers (Jahn et al., 2015).

Recognizing graduate program websites were the primary recruitment tool of many educational measurement graduate programs, Rios et al. (2019) conducted a content analysis to determine if websites of these graduate programs provided information useful to students from diverse ethnic backgrounds or those who required flexible graduate programs. Rios et al. (2019) found less than 20% of websites mentioned flexible programs available for unconventional students and less than half provided explicit information about the application and admissions process. However, funding opportunities and financial aid were mentioned across most program websites, as well as photos and descriptions of faculty members and their research interests (Rios et al., 2019). Ultimately, Rios et al. (2019) concluded the websites did not sufficiently attempt to recruit diverse students and, therefore, called for more commitment to diversity on graduate program websites.

Previous research on the usability of university websites has also identified the importance of culture in information-seeking behaviors online (Amirali & Bakken, 2015; Byrd et al., 2023; Diwanji, 2022). International students possess specific preferences and needs for online information and search for information differently than students who are accustomed to the information search habits of their home country (Binsahl et al., 2020). The literature has previously identified needs of students from specific countries and their experiences with programmatic websites when in the graduate application process for universities (Kim & Spencer-Oatey, 2021). By examining forums on social media, Kim and Spencer-Oatey (2021) found prospective Ph.D. students from Korea were largely confused about application processes, whether they needed an advisor before applying, universities' decision-making processes, and funding. Upon further examination Kim and Spencer-Oatey (2021) found most United Kingdom university websites were doing a poor job of providing prospective Ph.D. students with direct application process information, noting that the one university that provided specific information about the application process and contacting advisors did a better job of fulfilling international students' needs. Therefore, graduate programs should explore cultural elements to attract and welcome diverse international scholars with the aim of enhancing the global reach of research occurring in universities (Pandit, 2007; Tanyildiz, 2015).

Additionally, culture has been identified as influential in how audiences use and interpret social media when engaging with scientific information (Dobbins et al., 2021). Social media has been recognized—to varying degrees—as influential in the graduate program search process. One qualitative study found international students used social media to connect with others and gain information about universities (Byrd et al., 2023), while another found social media was not helpful in selecting a graduate institution (McNicholas & Marcella, 2022). Shields and Peruta (2019) used a mixed methods study and determined survey respondents found social media unimportant in selecting an undergraduate institution. However, upon qualitative follow-up, participants revealed they did explore social media when selecting an institution. Therefore,

further understanding of the role of both culture and graduate students' use of social media in selecting a program is needed. Additionally, there is a lack of literature overall concerning faculty members' lab websites and their role as a source of scientific communication for prospective graduate students, necessitating research into use associated with lab websites.

Conceptual Framework

The present study utilized uses and gratifications (U&G) theory and cultural dimensions theory in its conceptual framework.

Uses and Gratifications Theory

U&G theory assumes audiences are active consumers of media who select the communication channel based on their expectation that it will fulfill—or gratify—a specific need in their life (Katz et al., 1973). The concept was first introduced by Herzog (1940) in his work suggesting media access could be dependent upon the needs of the media consumers and their distinctive qualities. When first conceptualizing U&G theory, Katz (1959) argued mass media research needed to pivot from its current course of understanding the effects of mass media. Katz (1959) said the research community needed to ask “not ‘What do the media do to people?’ but ‘What do people do with the media?’” (p. 2). Fully conceptualized in later publications (Katz et al., 1973), U&G theory has been utilized to explore what audiences are, indeed, doing with the media and the needs satisfied by the media—also known as gratifications (Katz et al., 1974).

One influential element of U&G theory is the concept of gratifications sought and obtained and their relationship to one another. This relationship is explored in an effort to understand if the *expectation* of fulfilling a gratification has a relationship with the *gratification obtained* from using a specific media source (Rubin, 2002). To determine whether gratifications sought and obtained were related, Palmgreen and Rayburn (1985) tested a series of models concerning TV news and found the gratifications obtained from watching TV news and the affective experiences of TV news watchers influenced whether they were satisfied with the TV news-watching experience. The consensus from a body of work in the 1980s around gratifications sought and gratifications obtained indicated that, though the two were related, one did not predict the other (Palmgreen, 1984). More recently, Bae (2018) recognized little current research of gratifications sought and obtained and, therefore, aimed to use the concepts to understand intention of use on social media sites. Bae (2018) found differences between gratifications sought and obtained could more accurately predict use of social media than gratifications obtained alone, particularly when users obtained gratifications higher than those they sought. However, the lack of a direct relationship between gratifications sought and obtained indicates studying the concept of gratifications sought separate from gratifications obtained is appropriate, given their distinct nature.

With an increased variety in consumer selection of communication tools thanks to online technologies, there has been an enthusiastic expansion of U&G research to understand user motivations toward social media—much like in Bae's (2018) study. For example, researchers have focused on the gratifications users seek from Facebook in various contexts such as group membership influence on community engagement (Park et al., 2009), motivations and intensity of Facebook use in college students (Park & Lee, 2014), and the use of Facebook to satisfy needs of “social interaction, passing time, enjoyment, self-presentation, information seeking and social presence” (Hossain, 2019, p. 26). Within the science communication space, U&G theory has

been utilized to determine farmers' use of information and communication technologies according to their personal characteristics and motivation to engage on platforms such as Facebook (Narine et al., 2019) or predict agricultural opinion leaders' communication preferences based on their level of opinion leadership (Lamm et al., 2016). Most studies operationalizing U&G theory broadly examine the gratifications audiences receive from using a particular medium and associate demographic or psychographic characteristics with the gratifications to obtain deeper insights (Sundar & Limperos, 2013).

MAIN Model and Modality of Internet Use

Sundar and Limperos (2013) proposed a new iteration of U&G to address the changing media landscape and constant audience activity online—recognizing audiences on the internet are referred to as “users” instead of “audiences” because of their active engagement with the internet and “in keeping with the letter and spirit of the U&G paradigm” (p. 505). They argued online engagement presented even more opportunity for audiences to interact with media and, therefore, proposed the examination of online media in a new light (Sundar & Limperos, 2013). Sundar and Limperos (2013) suggested future U&G research focused on digital media should not only consider the gratifications users seek when interacting with digital media but the characteristics of the digital technologies themselves in gratifying those user needs. They found previous studies were likely to reuse and modify metrics from older types of media (like radio and television) to measure gratifications for newer types of media (like video games and YouTube; Sundar & Limperos, 2013). Therefore, Sundar and Limperos (2013) suggested operationalizing a new look at U&G through the lens of the MAIN model (Sundar, 2008) to identify the gratifications associated with utilizing certain types of digital technology, especially the varied experiences individuals can have when interacting with content on websites.

In constructing the MAIN model, Sundar (2008) argued the “affordances of digital technologies transform our media experience by inviting us to engage with content in such a personal way that we not only act, but actively construct meaning” (Sundar & Limperos, 2013, p. 505). The MAIN model posits there are heuristic characteristics of digital technology that signal to users the credibility of the information with which they are interacting based on four primary categories—modality, agency, interactivity, and navigability (Sundar, 2008). Heuristics are shortcuts in individuals' minds that allow them to either decide quickly or understand that they need to process information more systematically (Sundar & Limperos, 2013), and are, therefore, helpful for making decisions about the credibility of information.

The modality heuristic is based on the premise that the form in which information is presented influences how we process said information—whether the modality is in text, video, image, live video, audio, or even virtual reality (Sundar, 2008; Sundar & Limperos, 2013). According to the MAIN model (Sundar, 2008) and its application to the U&G framework, there are four expected gratifications from the modality heuristic: realism, coolness, novelty, and being there (Sundar & Limperos, 2013). Realism is the how much the digital representation resembles the real world rather than the digital one (Sundar, 2008). The coolness heuristic captures how cool or trendy a digital technology is based on its innovative and captivating features, such as the interface of Apple products (Sundar & Limperos, 2013). The novelty heuristic is triggered when users are more enamored by the newness or innovativeness of the digital platform than the actual information presented on the platform, therefore attributing more credibility to the novel platform than if it had been in a familiar digital format (Sundar, 2008). The being there heuristic happens when “receivers feel like they are part of a universe portrayed by the digital media” (Sundar, 2008, p. 81). Sundar and Limperos (2013) proposed realism, coolness, novelty, and

being there could be operationalized as user gratifications and, therefore, provide deeper insights into the types of gratifications users are seeking from digital content in specific contexts.

The MAIN model has been utilized to understand use of streaming services in a U&G context. Examining the modality concepts of novelty and distinctiveness, Evens et al. (2024) found respondents who preferred distinct characteristics of streaming platforms were more likely to adopt streaming over traditional platforms. Therefore, Evens et al. (2024) indicated streaming services should focus on the items that make their services unique to attract more users. However, exploration of the MAIN model in a U&G context across various communication media is still in its infancy.

Cultural Dimensions Theory

Commonly known as Hofstede's (1980, 2001) cultural dimensions theory, the conceptualization of cultural values was born from a study of IBM employees across 40 countries (Hofstede, 1980). From an initial data collection of managers across the IBM corporation, Hofstede (1980) suggested societal cultural values existed on a continuum relative to one another (Hofstede et al., 2011) in the following categories: collectivism/individualism, power distance, uncertainty avoidance, and masculinity/femininity (Hofstede, 1980). Subsequent studies added the cultural values of long term/short term orientation and indulgence restraint (Hofstede, 2001; Hofstede et al., 2010).

Collectivism/individualism, uncertainty avoidance, and power distance are some of the most popular and commonly cited cultural dimensions. According to Hofstede et al. (2010), within a society, collectivism/individualism is concerned with how much obligation an individual feels to look after themselves and their family members (individualism) versus how much obligation an individual feels to look after the interests of in-groups, protecting the interests of the members therein (collectivism). Uncertainty avoidance is how much, within a society, individuals seek to avoid uncontrollable or unknown elements of the future, setting in place plans to mitigate uncertainty of situations through stringent rules and guidelines if uncertainty avoidance is high (Hofstede et al., 2010). Within a society, power distance is how much those lower in the power structure accept their inequality with those higher in the power structure (Hofstede et al., 2010). Societies with lower power distance do not readily accept inequalities associated with power distribution, while societies with higher power distance are more likely to accept these inequalities (Hofstede et al., 2010).

Cultural dimensions are relevant in higher education because they have been shown to influence the value individuals associate with furthering their education (Hofstede et al., 2010). Individualists obtain advanced degrees because they will help them adapt to changing situations throughout their careers, while collectivists consider advanced degrees as rites of passage to take their place as what is considered a successful society member (Hofstede et al., 2010). Additionally, collectivism and individualism may influence the way in which students think critically, with students from collectivist countries like China seeking information differently than students from individualist countries like the United States (Lu et al., 2021). Within the higher education space, some studies have also attempted to connect cultural values to academic performance, especially considering differences broadly between Asian countries and European societies (Stankov, 2010), while others have more deeply examined cultural countries of origin when studying academic performance (Kao, 1995). Therefore, Baumann and Hamlin (2011) sought to understand how culture—as measured by power distance, uncertainty avoidance,

masculinity/femininity, and individualism/collectivism—was associated with international students’ “economic performance; level of competitiveness; and academic performance” (p. 182). Baumann and Hamin (2011) conducted a quantitative analysis in which they found that competitiveness in academics was driven by culture, and culture explained 32% of academic performance in students.

Culture has also been considered as an influential element of communication preferences. When choosing an institution, prospective students’ cultural backgrounds influence their choice to study in a specific country based on their perceived acceptance of their cultural values within an international university (Chen, 2008; Chung et al., 2009). For example, in examining the advertisement preferences of college students in Canada—a country with low power distance and high individualism—with advertisement preferences of college students in Peru—a country with high power distance and high collectivism—Pergelova and Angulo-Ruiz (2017) found face-to-face conversations and events from colleges were more influential for Peruvian students than they were for Canadian students. They also found Peruvian students preferred traditional advertising through print in comparison to the preferences of Canadian students (Pergelova & Angulo-Ruiz, 2017).

Purpose and Research Objectives

The purpose of this study was to determine if gratifications sought from asynchronous, online media channels varied based on graduate students’ individual-level cultural dimension scores. The study was guided by the following research objectives:

1. Describe gratifications sought from lab websites, departmental websites, and social media.
2. Identify the relationships between gratifications sought from lab websites, departmental websites, social media, and individual-level cultural dimension scores.
3. Determine if individual-level cultural dimension scores predict gratifications sought from lab websites, departmental websites, and social media.

Methods

Sample and Population

This target sample for this study was graduate students enrolled in highly ranked COAs at land-grant universities (LGUs). COAs were identified for participation in this survey based on their ranking on the 2023 Niche list of Best Colleges for Agricultural Sciences in America. Researchers identified the top two universities (as identified by Niche) in each Association of Public and Land Grant Universities Experiment Station Section (APLU ESS) region. From the Northeast region participating universities were Cornell University and the University of Vermont, ranked first and 30th overall in the 2023 Niche rankings, respectively. In the North Central region participating universities were The Ohio State University and University of Wisconsin-Madison, ranked seventh and eighth overall in the 2023 Niche rankings, respectively. In the Western region, participating universities were the University of California-Davis and Washington State University, ranked sixth and 20th overall in the 2023 Niche rankings, respectively. In the Southern region, participating universities were Texas A&M University, the University of Georgia, and the University of Florida, ranked second, third, and fourth,

respectively. Three universities from the Southern region were included because the instrumentation was initially piloted at the University of Georgia. To ensure a representative sample, two additional universities were included from the Southern region.

To recruit currently enrolled graduate students to participate in the study, researchers contacted administrators at each university, asking for access to reach students at their university. While some administrators at COAs elected to send out survey recruitment emails to students over college graduate student listservs, others preferred to have individual department leaders or graduate coordinators send survey recruitment emails to graduate students in their respective departments. Customized recruitment emails were provided for each university, emphasizing accordance with IRB protocol and the voluntary nature of the survey. Students received an initial survey email and at least two reminder emails in accordance with Dillman et al. (2014). One college did not provide direct access to their students. E-mails from graduate student directories on the public website for each COA department were used to reach out to students directly to ask them to complete the survey using an initial survey email and two reminder emails. The recruitment process and survey instrument were approved by the University of Georgia Institutional Review Board (Protocol # 00007201).

Instrumentation

The study utilized a quantitative research design through a web-based survey instrument distributed via the Qualtrics online survey platform. The findings presented here are part of a larger study to understand the characteristics of COA graduate students and the influences thereof on their communication tool use when searching for graduate programs and institutions.

For this study, respondents were asked to identify background information including information about their year of birth, gender, race/ethnicity, and marital status. Demographic characteristics of respondents are detailed in Table 1.

Table 1
Demographics of Respondents (N = 1,093)

	Frequency (<i>n</i>)	Frequency Percent (%)
Gender		
Male	340	31.1
Female	714	65.3
Non-binary/third gender	28	2.6
Preferred not to answer	11	1.0
Race/Ethnicity ^a		
White	709	59.0
Asian	199	16.6
Hispanic or Latino/a/x	146	12.2
Black or African American	78	6.5
American Indian or Alaskan Native	12	1.0
Native Hawaiian or Pacific Islander	7	0.6
Other or Preferred to Self-Describe	31	2.6
Preferred Not to Answer	18	1.5

Age category		
21-25	336	31.8
26-30	415	39.3
31-35	150	14.2
36-40	75	7.1
41-45	34	3.2
46-50	19	2.5
50+	26	2.5
Marital status		
Single (never married)	597	54.6
Married	287	26.3
Living with a partner, not married	161	14.7
Divorced	26	2.4
Separated	7	0.6
Prefer not to answer	15	1.4

Note. ^aRespondents were permitted to select more than one answer.

Respondents were then asked to select the communication tools they utilized when searching for graduate programs in the degree they were currently pursuing. Communication tools on the list were from a qualitative analysis of graduate student communication preferences in which 19 COA students participated in in-depth interviews about their graduate program search process (Byrd & Lamm, 2025). If respondents indicated they utilized any of three public, online, asynchronous communication tools (departmental websites, lab websites, or social media) the survey utilized skip logic to present them with a set of questions about that communication tool. For example, if a respondent indicated they used departmental websites and social media but did not use lab websites, they were only presented with additional questions regarding departmental websites and social media. The survey's length was therefore reduced for respondents for whom not all sections were relevant.

If respondents indicated they utilized departmental websites, lab websites, or social media during their graduate program search, they were presented with scales inquiring about gratifications sought for Web 2.0 and associated technologies modified from scales created by Sundar and Limperos (2013). The five-point, Likert-type scales had responses ranging from 1 = *Strongly Disagree* to 5 = *Strongly Agree* and measured constructs for modality or "the different methods of presentation ... of media content, appealing to different aspects of the human perceptual system ..." (Sundar & Limperos, 2013, p. 512). The gratifications sought constructs included realism, coolness, novelty, and being there (Sundar & Limperos, 2013) as related to what respondents were looking for in the use of each of the online asynchronous communication tools.

There were four items related to realism including statements such as "I sought departmental websites which were like visiting the department in real life." Three items related to coolness included statements such as, "I sought departmental websites which were stylish." Four items related to novelty included statements such as, "I sought departmental websites which contained innovative technology." Three items related to being there included statements such as, "I sought departmental websites which helped me immerse myself in a department that I

could not physically experience.” The gratifications obtained constructs remained the same for lab websites, departmental websites, and social media. Researchers added together responses to items in each construct and averaged the items to obtain a score for each gratification obtained construct—realism, coolness, novelty, and being there—for departmental websites, faculty lab websites, and social media. To test the reliability of the scale for each communication tool, Cronbach’s alpha was calculated post-hoc and was deemed acceptable ($\alpha \geq .70$) for each construct (Field, 2013).

To measure respondents’ individual-level cultural dimension scores, respondents were asked to think back to the time when they were applying to graduate school and respond to a portion of the previously validated CVSCALE (Yoo et al., 2011). Respondents were asked to respond to 16 items to measure individual-level collectivism, power distance, and uncertainty avoidance. Respondents indicated their level of agreement or disagreement with each statement (1= *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*; 5 = *Strongly Agree*) with six items measuring collectivism/individualism, five items measuring power distance, and five items measuring uncertainty avoidance. Responses were averaged to form an individual-level collectivism/individualism score, power distance score, and uncertainty avoidance score for reach respondent. Scale reliability was calculated post-hoc and deemed acceptable ($\alpha \geq .70$) according to Field (2013). Descriptive statistics for individual-level cultural dimension scores are detailed in Table 2.

Table 2
Individual-Level Cultural Dimension Scores

Cultural dimension	<i>N</i>	<i>M</i>	<i>SD</i>
Collectivism	1,091	2.91	0.65
Power distance	1,089	1.62	0.57
Uncertainty avoidance	1,089	4.14	0.55

Note. Each item was measured on a five-point Likert-type scale (1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*; 5 = *Strongly Agree*) and averaged for each construct to form a mean score between 1 and 5.

The instrument was reviewed for reliability and validity by subject matter experts in agricultural leadership, agricultural communications, and science communication. The instrument was then pilot tested with postdoctoral scholars and faculty at other universities who had recently completed their doctoral programs. Researchers modified the instrument based on reviewer feedback to clarify confusing language in the instructions and add two free-response questions. The free-response questions asked students about what ultimately led to their decision to pick their current graduate program and if they would do something differently in picking a graduate program if they were to seek a graduate program again.

Data Analysis

Data were analyzed using SPSS 29. Descriptive statistics and frequencies were used to describe demographic characteristics, gratifications sought, and individual-level cultural dimension scores. Pearson’s correlation coefficient was used to identify relationships between gratification levels sought and individual-level cultural dimension scores. The strength of the Pearson’s correlation coefficient ranges between -1 and +1. The effect size of the correlation

coefficient was operationalized using the following metrics: $\leq .10$ = small, 0.30 = medium, ≥ 0.50 = large (Cohen, 1988). Multiple regression analysis was used to determine if individual-level cultural dimension scores (independent variables) predicted gratifications sought scores for departmental websites, lab websites, and social media (dependent variables) through a series of 12 models.

The demographic and individual-level cultural dimension data were utilized across multiple studies as part of a three-article dissertation. Clearly disclosing the use of data in multiple analyses under varying circumstances is provided based upon Kirkman and Chen's (2011) recommendation. Within the present article, demographic data are used solely for the purpose of informing readers of respondent characteristics, while in other articles demographics were examined for their influence on other communication experiences and preferences. Additionally, individual-level cultural dimension scores were used as predictors of gratifications sought in the present study, whereas individual-level cultural dimension scores were examined for their relationships with communication tool frequency of use and gratifications received in subsequent articles.

Results

The first research objective sought to describe the gratifications sought for departmental websites, faculty lab websites, and social media. Respondents indicated higher mean preferences for realism on departmental websites, faculty lab websites, and on social media than for any other gratification sought (Table 3). Respondents indicated lower mean preferences for coolness on departmental websites, faculty lab websites, and on social media than for any other gratification sought.

Table 3

Gratifications Sought Through Online Asynchronous Communication Tools

Communication tool	Realism		Coolness		Novelty		Being there	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Departmental websites (<i>n</i> = 908)	3.49	0.71	3.03	0.83	2.66	0.80	3.11	0.96
Faculty lab websites (<i>n</i> = 625)	3.49	0.74	2.96	0.87	2.68	0.82	3.03	0.97
Social media (<i>n</i> = 174)	3.26	0.85	2.91	0.88	2.72	0.81	3.12	1.07

Note. Each item was measured on a five-point Likert-type scale (1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*; 5 = *Strongly Agree*) and averaged for each gratification sought construct to form a mean score between 1 and 5.

The second research objective sought to describe the relationships between gratifications sought scores for each online asynchronous communication tool and individual-level cultural dimensions of collectivism/individualism, power distance, and uncertainty avoidance. There were significant, positive relationships between collectivism and each gratification sought on departmental websites, though the effect size was small for each correlation (Table 4). There were also significant, positive relationships between uncertainty avoidance and each gratification sought on departmental websites, although the effect sizes were small. On faculty lab websites,

there were significant, positive relationships between collectivism and the following gratifications sought: coolness, novelty, and being there, each with a small effect size. On faculty lab websites, there were also significant, positive relationships between uncertainty avoidance and the following gratifications sought: realism and being there, each with a small effect size. There was a significant, positive relationship between power distance and novelty for both departmental websites and faculty lab websites, each with a small effect size. There were no significant relationships between individual-level cultural dimensions and social media gratifications sought.

Table 4
Correlations Between Gratifications Sought and Individual-Level Cultural Dimensions

Communication tools and gratifications sought	Collectivism	Power distance	Uncertainty avoidance
	<i>r</i>	<i>r</i>	<i>r</i>
Departmental websites			
Realism (<i>n</i> = 815)	.16***	.06	.14***
Coolness (<i>n</i> = 816)	.14***	.06	.09*
Novelty (<i>n</i> = 816)	.13***	.16***	.11**
Being there (<i>n</i> = 816)	.08*	.05	.15***
Faculty lab websites			
Realism (<i>n</i> = 595)	.06	-.03	.20***
Coolness (<i>n</i> = 594)	.12**	.05	.01
Novelty (<i>n</i> = 595)	.11**	.15***	.03
Being there (<i>n</i> = 595)	.10*	.02	.09*
Social media			
Realism (<i>n</i> = 170)	.12	-.01	-.04
Coolness (<i>n</i> = 170)	.02	-.05	-.09
Novelty (<i>n</i> = 169)	.13	.09	-.12
Being there (<i>n</i> = 170)	.14	-.05	-.03

Note. **p* < .05; ***p* < .01; ****p* < .001.

The third research objective sought to determine if individual-level cultural dimensions predicted gratifications sought from departmental websites, faculty lab websites, and social media during the graduate program search process. A series of multiple regression analyses were used to determine the predictive power of individual-level cultural dimensions on determining the gratifications graduate students sought from the online asynchronous channels identified (Table 5). The individual-level cultural dimensions of collectivism, power distance, and uncertainty avoidance significantly predicted preference for realism, coolness, novelty, and being there for both departmental websites and faculty lab websites in the multiple regression models. The multiple regression model with collectivism, power distance, and uncertainty avoidance predictor variables for realism sought on departmental websites resulted in $R^2 = .04$, indicating that with all three predictor variables, the model only explained 4% of the variance in realism sought on departmental websites. Despite the overall models being statistically significant, the R^2 for each model was .05 or below, indicating that with all three predictor variables, each model

explained 5% or less of the variance in the gratification sought. The individual-level cultural dimensions did not significantly predict any gratifications sought from social media during the graduate program search process.

Table 5
Multiple Regression Analyses of Cultural Dimensions' Predictive Power on Gratifications Sought

Communication tools and gratifications sought	Constant	Collectivism	Power distance	Uncertainty avoidance	F	R ²
	β	β	β	β		
Departmental websites						
Realism (n = 815)	2.26	0.20***	0.05	0.17***	11.70***	0.04
Coolness (n = 816)	1.97	0.20***	0.06	0.12*	7.02***	0.03
Novelty (n = 816)	1.30	0.11*	0.21***	0.17**	13.41***	0.05
Being there (n = 816)	1.54	0.09	0.09	0.28***	8.65**	0.03
Faculty lab websites						
Realism (n = 595)	2.37	0.04	-0.04	0.26***	8.43***	0.04
Coolness (n = 594)	2.48	0.16**	0.03	-0.01	3.08*	0.02
Novelty (n = 595)	1.97	0.10	0.19**	0.03	5.93***	0.03
Being there (n = 595)	2.09	0.13*	0.01	0.14	3.25*	0.02
Social media						
Realism (n = 170)	3.28	0.17	-0.08	-0.09	1.15	0.02
Coolness (n = 170)	3.61	0.05	-0.09	-0.17	0.69	0.01
Novelty (n = 169)	3.12	0.13	0.07	-0.21	1.99	0.04
Being there (n = 170)	3.08	0.26*	-0.18	-0.10	1.83	0.03

* $p < .05$; ** $p < .01$; *** $p < .001$.

Conclusions, Implications, and Recommendations

There is a need to empirically understand the experiences of graduate students—both domestic and international—when they are searching for and deciding to enroll in a graduate program (McNicholas & Marcella, 2022). The interpersonal nature of communication and relationship-building between prospective students and faculty, as well as prospective students and current students or alumni (Byrd et al., 2023; Huang & Bilal, 2019) has been highlighted by previous research. The present study sought to explore the dynamics between individual-level cultural dimensions and the gratifications graduate students sought during their graduate program search process to create online, asynchronous communication tools tailored to prospective student needs based on their characteristics (Jahn et al., 2015). The findings indicated respondents moderately valued realism and being there as valuable gratifications sought on departmental websites, faculty lab websites, and social media. However, there were only significant relationships between the gratifications sought on departmental websites and faculty lab websites and individual-level cultural dimensions. In analyzing the predictive power of

individual-level cultural dimensions and gratifications sought, cultural dimensions only predicted preferences for gratifications sought on departmental websites and lab websites.

Limitations

Before the full implications of this study and recommendations thereof are discussed, limitations should be addressed. First, the study was limited to students in COAs and, therefore, cannot be generalized to the larger population of graduate students. Additionally, because the survey was conducted online, it was limited to students who had internet access. Finally, there is limited literature which operationalizes the modality measures of realism, coolness, novelty, and being there in the context of U&G theory. Therefore, there is no previous connection between the modality measures and cultural dimensions.

Conclusions and Implications

Despite the limitations, several findings can assist in identifying strategies for communicating with prospective graduate students. First, gratifications sought scores were consistently highest across the board regarding realism on departmental websites, faculty lab websites, and social media. These findings imply respondents desired websites and social media accounts that were credible, provided a feeling like that of communicating face-to-face, and provided them a glimpse into visiting departments, labs, or universities in real life, allowing them to see the university environment personally (Sundar & Limperos, 2013). Being there was the next highest mean score for all three communication tools implying that when students were searching for graduate programs, they sought communication tools that helped them immerse themselves (Sundar & Limperos, 2013) in a department, lab, or university by giving them the feeling of being on campus, notably because they were not able to actually visit themselves. Sundar and Limperos (2013) emphasize the modality of being there is distinct from realism because it allows the user to have a sense of control and personalization of their online experience. However, the mean score was not high enough to indicate it was extremely important to students in their graduate program search.

The mean score was lowest for novelty across all three communication tools. Therefore, students either “disagreed” or “neither agreed nor disagreed” that they were looking for communication tools with innovative layouts or different/unusual experiences. Navigability and usability of university websites was of paramount importance in previous studies (Jahn et al., 2015; Poock & Lefond, 2003); therefore, it is understandable students would appreciate familiar site structures and find them easier to navigate.

There were significant, positive relationships between collectivism and realism, coolness, novelty, and being there on departmental websites. These findings are in line with the values of collectivism, considering levels of collectivism/individualism play a role in how individuals seek information (Lu et al., 2021). There were significant, positive relationships between uncertainty avoidance and realism, coolness, novelty, and being there. Since individuals who have high uncertainty avoidance are more likely to prefer structure and avoiding the unknown (Hofstede et al., 2010), they may prefer to engage in departmental websites that allow them to be more certain about the university they attend by examining websites that allow them a glimpse into the department’s credibility. However, the finding of a significant, positive relationship between uncertainty avoidance and novelty is not in alignment with Hofstede et al.’s (2010) assumptions

about uncertainty avoidance. Hofstede et al. (2010) posits that individuals from high uncertainty avoidance societies tend to prefer rules and structure that guard against the unknown. In the case of the present study, items in the novelty construct indicated respondents were looking for departmental websites with the following characteristics: innovative technology, different layouts than that of other departmental sites, and sites which provided an unusual online experience. Therefore, this relationship should be explored further by examining additional personal characteristics that influence individuals' preference for novelty which could also align with their penchant toward uncertainty avoidance. Because innovative technology and unique layouts could be an indicator of an academically innovative department, perhaps the use of novel website designs helped individuals with higher uncertainty avoidance feel confident in the status of the program.

The only significant relationship with power distance on departmental websites was that of power distance and novelty. The positive relationship—albeit with a small effect size—indicated those with a higher acceptance of the inequalities within a society were interested in innovation and different website layouts. Perhaps this is because these respondents would be likely to look to departmental leaders for innovation in research and expect the leaders to guide them toward career goals. It is notable that novelty has a significant relationship with all three individual-level cultural dimensions in the context of departmental websites. It is, therefore, necessary to explore additional variables that could influence a preference for novelty. Additional characteristics that may be associated with a preference for novelty could be prospective students' familiarity with the aim of the department and the associated jargon (Jahn et al., 2015) or the level of diversity students feel or the flexibility of the program they require (Rios et al., 2019). Previous studies have indicated that departmental websites often fail to cater to diverse students or those who are new to the discipline of the graduate program (Jahn et al., 2015; Rios et al., 2019). Therefore, novelty of sites that are innovative with different layouts could help students with high uncertainty avoidance feel more secure in enrolling in a different type of program than all the others they may have encountered in their online search. Students in lower levels of degree programs may also be more likely to have higher power distance scores based on their age and inexperience. It is possible younger, more inexperienced students prefer novelty, and this idea should be tested in future research.

There were fewer significant relationships between gratifications sought and cultural dimensions on faculty lab websites. The significant, positive relationship between uncertainty avoidance and realism implies individuals with higher uncertainty avoidance may have desired a strong understanding of the structure of the lab to imagine their role in it before applying to be a part of the research team. The strong, positive correlation between collectivism and coolness, novelty, and being there indicated the need between those more loyal to overall groups (Hofstede et al., 2010) were interested not only in innovation but in understanding the lab experience, which is understandable when seeking to join a group dynamic. The strong, positive relationships between uncertainty avoidance and realism, as well as uncertainty avoidance and being there, are in alignment with the desire to mitigate unknowns (Hofstede et al., 2010) about joining a lab by seeking to understand the environment through online sources as much as possible, especially given the amount of time some students spend in labs during their graduate programs.

Individual-level cultural dimensions significantly predicted gratifications sought of realism, coolness, novelty, and being there on departmental websites. Individual-level cultural dimensions also significantly predicted gratifications sought of realism, coolness, novelty, and

being there on faculty lab websites. While the variance explained by individual-level cultural dimensions was between 2% and 5% for each model, the findings imply considering the needs of individuals and their cultural values when building websites may be an element to bear in mind when catering to the needs of prospective graduate students. While previous studies have identified cultural values as influential on prospective students' communication preferences (Chen, 2008; Chung et al., 2009; Pergelova & Angulo-Ruiz, 2017), other have identified funding availability and flexibility (Kim & Spencer-Oatey, 2021; Shellhouse et al., 2020) as influential in appealing to diverse graduate students with specific needs on departmental websites. Therefore, the findings of the regression analyses indicate culture is a very small contributor to the preferences students hold when interacting with websites, and other elements should be considered in combination with cultural values to gain a holistic view of what influences prospective students' gratifications sought when accessing asynchronous, online communication tools during the graduate program search process.

The study was limited to students within COAs wherein graduate degrees are largely research-based in applied physical science fields—such as horticulture, animal sciences, plant breeding, or entomology—with fewer social science fields—such as business or communication—which may be considered professional degrees in some contexts. The type of degree a graduate student is pursuing—research or professional—can influence what they search for in a graduate institution and is influenced by cultural background (Chen, 2008). Therefore, future studies should examine if the role culture plays in gratifications sought varies according to the type of degree students are seeking, which could provide insights for colleges offering a myriad of graduate degrees. Additionally, the age of students pursuing graduate degrees should be considered in the gratifications they are seeking during their online search process. Younger students may be accustomed to using technology differently than older students and have different preferences for website features based on their level of comfort with different types of web features, such as virtual reality, which could be a powerful tool for enhancing the gratification of being there (Sundar & Limperos, 2013). Finally, while this study highlighted students' individual-level cultural dimensions and the ability to predict their gratifications sought, students from specific countries may have their own expectations when it comes to university web content (Kim & Spencer-Oatey, 2021). Therefore, future studies may benefit from exploring how students from specific target countries perceive the content of COA departmental websites.

The lack of significant relationships or predictive power present in the examination of social media gratifications sought may have been attributed to the lower level of response from respondents who indicated they utilized social media in their graduate program search process. However, this may also be due to the various types of social media, all with varying modalities on each platform. For example, users may seek different gratifications on X (formerly Twitter) as a primarily text-based social platform than they do on Instagram, a primarily image- and video-based platform. The low number of social media-using respondents in this study indicated social media platforms may not be the most effective way to reach broad populations as they are engaging in the graduate program search process.

Recommendations

Individual-level cultural dimensions did significantly predict prospective graduate students' gratifications sought on departmental websites and faculty lab websites; however, it

accounted for a very small amount of variance. Therefore, future research should explore other elements that influence what prospective students seek from these communication tools. The current study was focused on the usability and the experience of the modalities associated with online, asynchronous communication tools. However, it did not address the type of content prospective graduate students preferred to find online. While previous studies have examined the use of graphics, photos, and text on graduate program websites (Jahn et al., 2015; Pooch & Lefond, 2003), the continuous evolution of online culture and user expectations necessitate the reexamination of user preferences according to specific online platforms. Future studies should not only evaluate departmental and lab websites for their user experiences (Eldrandaly et al., 2023; Yerlikaya & Onay Durdu, 2017) but delve into the websites' effects on students based on their stage within the graduate program search process, which can play a critical role in their communication experiences (McNicholas & Marcella, 2022). Future studies should also survey students who are actively searching for graduate programs rather than asking respondents to retroactively reflect on their experiences. Then, once students are enrolled in graduate programs, researchers could follow up with them to determine if their perceptions of graduate program or lab websites differ based upon their enrollment. The findings of this research should be considered in creating departmental website standards in COAs, therefore necessitating a set structure across departments to appeal to students' needs. Specifically, agricultural communications departments could be instrumental in creating these standardized sites by lending science communication expertise—both theoretical and practical—to overall design recommendations. As communication experts, it is crucial for agricultural communications departments to set the standard for web design and model it to other departments, therefore showcasing the success of effective online communication in attracting graduate students who fit well within a program.

While preferences for university and graduate program websites have been explored (Eldrandaly et al., 2023; Rios et al., 2019; Yerlikaya & Onay Durdu, 2017), little research has been conducted on faculty lab websites. Faculty lab websites are often not requirements at universities. They may take on many structures, be created and hosted by university website teams, or be maintained independently by faculty members. Additionally, students in the social sciences may not have as much experience with faculty lab websites as those in graduate programs who work physically in research labs. To attract quality graduate students into agricultural communications graduate programs, faculty should consider the type of students who would thrive under their leadership and consider these characteristics in building their faculty lab websites. For example, if a faculty member has a leadership style focused on explicit rules and hands-on guidance, students with higher uncertainty avoidance may thrive in their labs. Therefore, faculty may benefit from creating websites that provide a credible, realistic glimpse into what working in their lab looks like, with student experiences detailed and several current photos displayed that emphasize realism. Further research on effective faculty website design is needed to explore and subsequently train faculty on the nuances of tailoring websites to appeal to prospective students while simultaneously sharing their research with target audiences. Agricultural communications researchers could be crucial in conducting this research alongside faculty members at their respective universities, guiding them in website creation and using the websites for research on student preferences for lab websites across various disciplines. Finally, universities may consider offering professional development or class credit for graduate scholars to teach them about the importance of website maintenance in science communication and graduate recruitment.

There were no significant relationships between individual-level cultural dimensions and gratifications sought from social media. Therefore, future studies should examine the differences in gratifications sought from individual social media platforms for students who used them during the graduate program search process. Different social media platforms may offer various gratifications and may depend on how frequently people utilize social media platforms (Evens et al., 2024). Future research could benefit from examining if students engaged in different disciplines are more likely to use one social media platform and subsequently dive deeper into their gratifications sought on that platform. For example, agricultural communications programs could examine prospective graduate students' preferred platforms within their discipline, determine if students are utilizing the platforms for academic purposes, and, if so, the types of content that keep them engaged with departments or universities as a whole. Such examination of niche audiences that often form on social media may be a better use of resources than examining social media as a broad subject area for graduate recruitment. With the low number of respondents who indicated their engagement with social media during the graduate program search process, research into the intricacies of social media in the graduate recruitment process may not be as fruitful as devoting research to the structure of departmental and faculty lab websites. When building strategic communication plans, graduate programs may find their social media platforms should be targeted at existing students or alumni rather than tailored to the preferences of prospective graduate students.

Overall, consideration of cultural preferences in online asynchronous communication tools for prospective graduate students is but one piece of a multifaceted science communication strategy needed to appeal to aspiring scholars.

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