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Kumudu P.P.. Kopiyawattage
University of Florida

Alexa J. Lamm
University of Florida

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Abstract

Extension educators can help the public learn about critical issues that contribute to existing problems in communities. Water is just such an issue in Florida—in fact, water is the top issue in Florida. The purpose of the study reported in this article was to identify Florida residents' opinions about clean water and their preferred modes of learning about water quality. Findings relate to how information about water quality should be transferred to the public and can guide the development of Extension programming.

Kumudu P. P. Kopiyawattage
Graduate Assistant
Agricultural Education and Communication
University of Florida
Gainesville, Florida
kumudupdn@ufl.edu

Alexa J. Lamm
Assistant Professor
Agricultural Education and Communication
University of Florida
Gainesville, Florida
alamm@ufl.edu

Introduction

Florida, the nation's third most populous state, is surrounded by water on three sides and is full of lakes, streams, and rivers. Despite access to diverse water bodies, competing needs for water resources have led to water's being recurrently identified as the top issue facing the state (Huang & Lamm, 2015; Odera, Lamm, Dukes, Irani, & Carter, 2013). As a result, water-focused Extension programs are being developed and implemented, but such programming may not be reaching target audiences, resulting in decreased effectiveness.

According to Shepherd (1999), clear identification of target audiences is a must for ensuring the effectiveness of educational programs. Warner (2014) and Mahler et al. (2010) discussed the advantages of designing and delivering customized programs for specific Extension audiences rather than addressing audiences generally. Research on audience needs is necessary for ensuring a better understanding of audience perceptions of specific behaviors, including an understanding of factors that may hinder or promote engagement (McKenzie-Mohr, Lee, Schultz, & Kotler, 2011).

Several studies have examined audience needs related to water education in nonformal settings. For example, Terlizzi (2006) explored how media could be used to deliver Extension education programs addressing water quality degradation issues in the Chesapeake Bay area and found that using media the audience is most familiar with is most effective.

The purpose of the research reported here was to identify Florida residents' needs related to water quality to

inform the development of educational programs focused on enhancing behaviors associated with water protection. The specific objectives of the study were as follows:

- Identify the levels of importance Florida residents associated with clean water resources.
- Determine water-related topics of most interest to Florida residents relative to the levels of importance they associated with clean water resources.
- Identify Florida residents' preferred modes for learning about water-related topics relative to the levels of importance they associated with clean water resources.

Methods

The study presented here was part of a larger research effort designed to capture public opinion of water issues in Florida through the use of an online survey. The survey used in the RBC Canadian Water Attitudes Study (Patterson, 2012) was the foundation for the researcher-adapted survey instrument. A panel with expertise in water quality and quantity issues, public opinion research, and Extension programming reviewed the instrument to ensure content and face validity. Pilot testing with 50 Florida residents was conducted, and all constructs were confirmed as reliable, with Cronbach's alpha levels of .70 or higher. Once finalized, the instrument and study protocol were approved by the University of Florida Institutional Review Board.

Three sections of the survey instrument were germane to the study reported here. First, respondents were asked to indicate the levels of importance they associated with clean water in seven water sources using a Likert-type scale with response options ranging from 1 (*not at all important*) to 5 (*extremely important*). Next, respondents were asked to indicate which of 14 water-related topics they would be interested in learning more about. Respondents were allowed to indicate all that were applicable. Respondents were then asked to indicate which of 11 modes of learning they would be interested in if they were offered the opportunity to learn more about water-related topics. Again, they were permitted to check all that were applicable. Last, demographic data were collected.

Nonprobability opt-in sampling techniques were used for data collection. This sampling method is often used in public opinion research to make population estimates (Baker et al., 2013). A public opinion research company implemented the survey by sending an invitation and survey link to 1,192 Florida residents aged 18 and older. A response rate of 63% was obtained, with 749 responses. Weighting procedures were implemented to compensate for potential exclusion, selection, and nonparticipation biases, all of which are limitations of nonprobability sampling. Post-stratification methods (Kalton & Flores-Cervantes, 2003) were used for weighting to ensure that the composition of the sample was representative of Florida adult residents.

For segmenting the audience into groups based on the overall levels of importance they associated with clean water resources, *z* scores were used. First, an individual's responses related to the levels of importance of clean water in the seven water sources identified on the survey were averaged to create the person's overall importance-of-clean-water score. The construct was found to be reliable, with a Cronbach's alpha coefficient of .90. The importance-of-clean-water score for each individual was then converted to a *z* score, with a *z* score of 1 indicating an importance-of-clean-water score one standard deviation above the mean and a *z* score of −1 indicating an importance-of-clean-water score one standard deviation below the mean. If a respondent had a *z* score greater than 0.50, he or she was characterized as associating a high level of importance with clean water

("high" group). If a respondent had a *z* score between −0.49 and 0.49, he or she was characterized as associating an average level of importance with clean water ("average" group). Last, if a respondent had a *z* score less than −0.49, he or she was characterized as associating a low level of importance with clean water ("low" group).

In further analysis, chi-square tests were used for examining the relationships between respondents' associated levels of importance of clean water and their interest in water topics and between their associated levels of importance of clean water and their learning mode preferences and determining, accordingly, whether statistically significant differences existed among the three groups. Statistical significance was established as $p < .05$ a priori.

Results

Importance of Clean Water Resources

A respondent was asked to indicate on a 5-point Likert-type scale the level of importance he or she assigned to clean water in each of seven sources. Overall, respondents associated high levels of importance with clean water in all sources, with the greatest proportions indicating that clean water was either highly important or extremely important in drinking water, beaches, and groundwater (Table 1).

Table 1.

Importance of Clean Water Resources (*N* = 749)

Water source	No. of respondents	Highly important or extremely important (%)
Clean drinking water	734	98
Clean beaches	667	89
Clean groundwater	667	89
Clean lakes, springs, rivers	652	87
Clean oceans	644	86
Clean bays and estuaries	644	86
Clean water for shellfishing	584	78

As noted previously, respondents were categorized in three groups according to the overall levels of importance they placed on clean water. The demographic characteristics of the three groups are shown in Table 2. Gender and age distributions were similar across the three groups; however, those in the "high" group tended to be more educated than their counterparts in the other two groups.

Table 2.

Demographics by Importance-of-Clean-Water Group

Demographic category	High (*n* = 307) (%)	Average (*n* = 205) (%)	Low (*n* = 237) (%)
Gender			
Male	35	39	36
Female	65	61	64
Age			
18–29 years	22	18	19
30–39 years	11	13	12
40–49 years	17	18	11
50–59 years	23	23	25
60 and above	27	28	33
Highest level of education			
Less than 12th grade	5	2	2
High school graduate	21	22	15
Some college, no degree	31	29	31
2-year college degree	14	15	14
4-year college degree	22	24	27
Graduate or professional degree	7	8	11

Note. The "high," "average," and "low" categories represent audience segments based on the overall levels of importance respondents associated with clean water resources; *z* scores were used for segmenting the audience into these three groups.

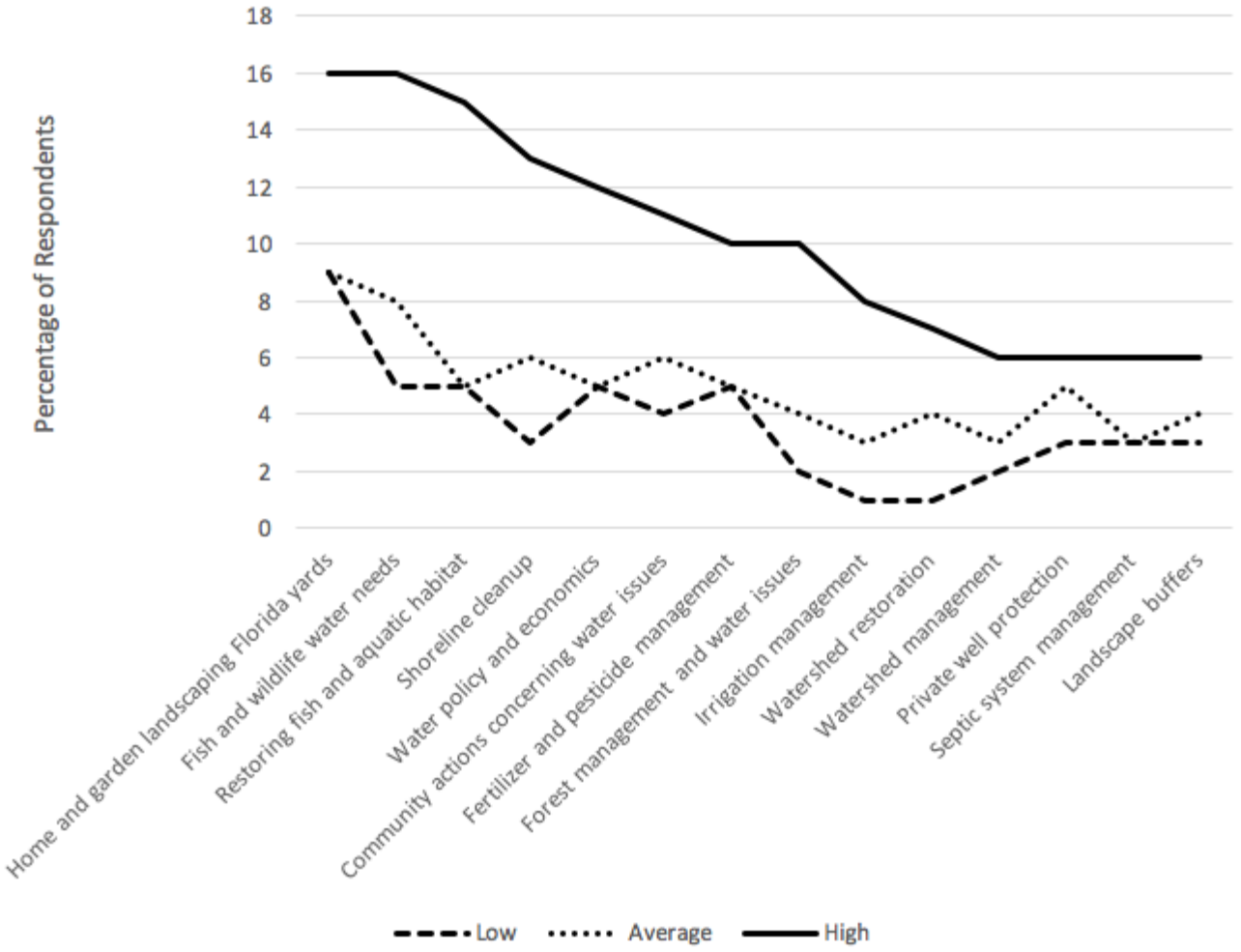
Interest in Learning About Water-Related Topics

Preferences for learning about water-related topics were then examined by group. Figure 1 shows that respondents in the "low" group had relatively lower interest in learning about all water-related topics when compared to the other two groups. Members of all three groups were most interested in learning about home

and garden landscaping in Florida yards. Members of the "high" group also were interested in learning about fish and wildlife water needs and restoring fish and aquatic habitats. Members of all three groups were least interested in learning about watershed management and septic system management.

Figure 1.

Water Topic Preferences by Importance-of-Clean-Water Group



Chi-square tests were used for analyzing the relationships between respondents' importance-of-clean-water levels and preferences for learning about water-related topics to determine whether significant differences existed among the three groups. Table 3 displays the results of the chi-square tests for these relationships. Preferences for learning about all the water-related topics, except fertilizer and pesticide management, landscape buffers, private well protection, and septic system management, were significantly different among the three groups.

Table 3.

Association Between Importance of Clean Water and Water Topic Preferences

Water-related topic	X^2	*p*
Fish and wildlife water needs	39.85	<.05

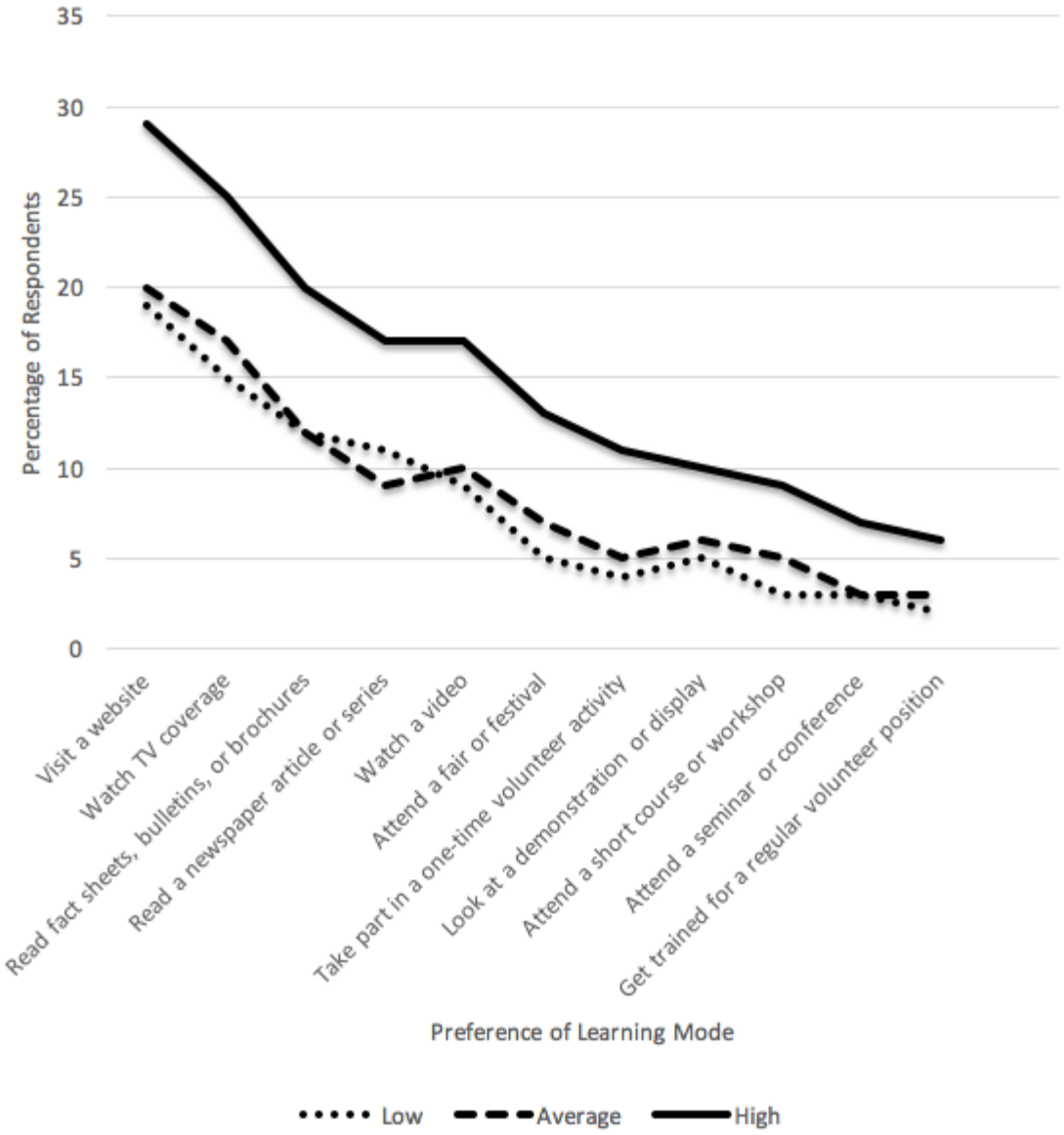
Shoreline cleanup	37.66	<.05
Watershed restoration	35.85	<.05
Restoring fish and aquatic habitat	30.12	<.05
Forest management and water issues	24.98	<.05
Irrigation management	22.19	<.05
Watershed management	17.73	<.05
Community actions concerning water issues	13.98	<.05
Water policy and economics	12.22	<.05
Home and garden landscaping Florida yards	7.78	<.05
Fertilizer and pesticide management	6.07	.05
Landscape buffers	5.32	.07
Private well protection	5.21	.07
Septic system management	4.78	.09

Preferred Modes of Learning

Preferred modes of learning were then examined by group (Figure 2). All three groups showed similar patterns of learning mode preferences, although the "high" group showed more overall interest. The most preferred modes of learning were visiting a website and watching TV coverage. The least preferred modes of learning were attending a seminar or conference and getting trained for a volunteer program.

Figure 2.

Preferred Modes of Learning by Importance-of-Clean-Water Group



Chi-square tests were used for analyzing the relationships between respondents' importance-of-clean-water levels and learning mode preferences to determine whether significant differences existed among the three groups (Table 4). Learning mode preferences, except reading fact sheets, bulletins, or brochures and reading newspaper articles or series, were significantly different among the three groups.

Table 4.

Association Between Importance of Clean Water and Preferred Modes of Learning

Mode of learning	X^2	*p*
Take part in a one-time volunteer activity	15.12	<.05
Attend a fair or festival	14.46	<.05
Watch a video	13.54	<.05
Attend a short course or workshop	13.47	<.05

Watch TV coverage	13.26	<.05
Visit a website	11.17	<.05
Get trained for a regular volunteer position	11.00	<.05
Attend a seminar or conference	7.39	<.05
Look at a demonstration or display	7.38	<.05
Read fact sheets, bulletins, or brochures	5.68	.06
Read a newspaper article or series	4.11	.13

Conclusions, Implications, and Recommendations

Florida residents considered the presence of clean water resources important. A majority of the respondents (78%) had lived in Florida for more than 10 years, so it could be assumed that they were aware of the water issues the state faces. Respondents in the "high" category expressed the most concern for water quality and, therefore, are most likely to change. Perhaps relevant Extension programs should be focused on targeting this group initially to capitalize on limited resources. A gender difference is clearly present in this group; there were more female respondents. Therefore, designing specialized programs for educating women about protecting water resources could be a wise approach.

Home and garden landscaping, fish and wildlife water needs, and restoring fish and aquatic boundaries are the water-related topics of most interest to the "high" group. Therefore, when designing Extension programs, educators should consider focusing educational programs on these highly preferred topics and incorporating relevant conversations about water quality to reach audiences with information they are most interested in obtaining.

Visiting websites and watching TV coverage were the most favored learning modes identified, followed by watching videos and reading newspaper articles. Compared to these categories, respondents' preferences for attending seminars and conferences and getting trained for regular volunteer programs were low. According to the findings of the study, face-to face approaches, which are the most common way Extension educates currently, seem to be less preferred by the public. Therefore, a shift in information-disseminating practices may be needed. Education could be improved through the use of technology because visual learning is greatly preferred by learners (Dooley & Murphy, 2001). Technology, such as webinars and online workshops, could be used innovatively to educate the public.

Tests were conducted for determining whether there were differences relative to respondents' importance-of-clean-water levels and preferences for learning about water-related topics. The results indicated that preferences for learning about fertilizer and pesticide management, landscape buffers, private well protection, and septic system management were positively correlated with respondents' associated importance-of-clean-water levels. Respondents' preferred to learn more about other water-related topics considered in the study irrespective of their associated importance-of-clean-water levels. Because the majority of the respondents are willing to visit a website to receive information, developing informative websites and even using social media could be effective strategies. Differences in the associations between respondents' importance-of-clean-water

levels and their preferences for learning by reading fact sheets, bulletins, or brochures or reading newspaper articles also existed. This finding implies that individuals who assign different levels of importance to clean water have different learning preferences when it comes to reading fact sheets, bulletins, brochures, or newspapers.

For further exploration of public perceptions of water issues, the study described here should be replicated in other states, or on a national level, and the findings should be compared to those presented here. Florida is a unique state, given the vast use and distribution of water resources combined with an ever-growing and changing population (Huang & Lamm, 2015). It would be informative for Extension educators across the United States to find out whether there are similarities or differences between Florida residents' perceptions about the importance of clean water and those of residents of the rest of the United States.

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