Knowing Your Clientele: Analysis of the Texas Pesticide Safety Education Program

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Abstract

The study described in this article was conducted to determine if an association exists between participants' demographics and their perceptions of program quality for the Texas A&M AgriLife Extension Service Pesticide Safety Education Program (PSEP). Using data collected from individuals who underwent training from the PSEP between 2009 and 2016, it was determined that the participant's age, length of service, and applicator status were the most influential demographic attributes. Findings from the study supported previous findings on educational barriers and have allowed for improved educational efforts to better target PSEP clientele.

Keywords: demographic correlation, pesticide safety education program

Introduction

As humans moved away from hunting and gathering toward farming societies, agricultural practices were developed to increase food supplies. One practice developed during this transition was the use of pesticides. The term "pesticide" covers a wide range of compounds, including insecticides, fungicides, herbicides, rodenticides, molluscicides, nematicides, plant growth regulators, and others (Aktar et al., 2009). Pesticides increase crop yields and crop quality by controlling the pests that limit these two factors (Aktar et al., 2009). Not limited to agriculture, pesticides have considerable use in urban settings. Understanding that certain organisms serve as vectors of human diseases and others are agricultural pests creates a need for their control (Mann and Kaufman, 2012). With the development and progression of intensive agriculture, fewer Americans have relied on agriculture as a source of income, and many have migrated to more urban areas over time (Molloy et al., 2011). Increased migration to metropolitan areas has consequently increased the need to control urban pests to maintain acceptable standards of living.

Although pesticides may be of great benefit, if used improperly, they can wreak havoc on the environment, our pocketbooks, and our health (Lee et al., 2011; Luck et al., 2010; Tiryaki and Temur, 2010). A pesticide safety education program (PSEP) contributes to resource development and distribution, and it educates individuals

concerning pesticides and their use (McCorkle et al., 2014). The economic analysis by McCorkle et al. (2014) also revealed that the PSEP in California, Illinois, Indiana, Iowa, Nebraska, North Carolina, and Texas directly contributed to 120,543 pesticide applicator jobs with a total salary base of $3.9 billion. With this societal importance of pesticides and their role in the economy, understanding individuals who participate in PSEPs is necessary and can aid in the development of educational programs and associated materials.

Understanding one's clientele is essential for effective Extension programming across all program areas. The use of current and reliable demographic data is crucial to develop effective programming and educational material, to track change, and to uncover hidden characteristics (Curtis et al., 2012). By understanding demographics associated with a program, coordinators can use appropriate educational and programming methods targeted for their clientele. While community data can be located using current census findings presented in the program American Factfinder (Curtis et al., 2012), these data would not include information on special interest groups. Due to changing demographics and the evolving nature of Extension programming, there is a clear need for Extension programs to become even more diverse in terms of participants, volunteers, and staff (Guion and Diehl, 2010). For Extension programming targeting potential pesticide applicator candidates, demographic variables revolving around education, age, company size, potential applicator status, and type of applications have been used to identify and sort participants. The purpose of the study reported here was to capture specific demographic information of those participating in Texas A&M AgriLife Extension Service's PSEP.

Methodology

The population of the study comprised individuals who had taken a training course provided by Texas A&M AgriLife Extension Service's PSEP instructors between January 2009 and August 2016 and completed the post program questionnaire (N = 2,310). The questionnaire was developed by the researchers based on review of literature and goals of the PSEP. The questionnaire included course and speaker satisfaction questions as well as both generic- and industry-specific demographic questions. Specifically, generic demographic questions covered age and level of education, while industry-specific questions covered length of industry service, number of employees at the company, whether the participants made agriculture (ag) applications, and whether they made urban applications. Participants were also asked to state whether they were seeking a commercial or noncommercial license. The difference being that a commercial applicator operates a business or is employed by a business that applies restricted-use or state-limited-use pesticides to the property of another person for hire or compensation, while a noncommercial applicator is required to be licensed but does not qualify as a commercial applicator.

Questions concerning the rating of the course and speaker used a Likert scale format. Most demographic questions involved a multi-option format; exceptions were questions asking if the participant did or did not make ag and/or urban applications and if the

participant was a commercial or noncommercial applicator candidate. Questions not following a multi-option format followed a dichotomous (two-option) format.

Although the questionnaire was able to collect data to determine if correlations existed between course and speaker variables, the focus of the study was to highlight significant correlations involving demographic variables. These correlations would be between demographic variables and course ratings, between demographic variables and speaker ratings, and among demographic variables. We determined that Kendall's tau would be the appropriate statistical method for the study (Field, 2009) and that statistical significance would apply at both the .01 and .05 levels. Correlations that were significant at the .01 level and had a correlation coefficient of less than -.300 or greater than .300 were deemed very significant.

Results

The largest number of significant correlations occurred for age of participant. For this variable, there were 10 correlations significant at the .05 level, of which seven were significant at the .01 level. Seven significant correlations occurred in relation to the participants' applicator status. For this variable, there were seven correlations significant at the .05 level and four at the .01 level. For the variable of length of service, there were six correlations deemed significant at the .05 level, of which five were significant at the .01 level, and one was significant at the .01 level with a correlation coefficient ±.300. The largest number of significant correlations that also had a correlation coefficient ±.300 occurred for the variable asking if the participant made urban applications. For this variable, there were six correlations deemed significant at the .05 level, of which two were significant at the .01 level, and two were significant at the .01 level with a correlation coefficient ±.300. For the variable asking if the participant made ag applications, there were three correlations deemed significant at the .05 level, of which two were significant at the .01 level, and one was significant at the .01 level with a correlation coefficient ±.300. For the variable of level of education, there were two correlations deemed significant at both the .05 and .01 levels.

Only one correlation was deemed significant for the variable asking for the total number of employees in the participant's company. This correlation was significant at both the .05 and .01 levels. Because the question of whether the participant was a commercial or noncommercial applicator was posed in a dichotomous either/or format, negative correlation coefficients of the variable are positive associations with commercial applicators while positive correlation coefficients are positive associations with noncommercial applicators.

Correlations between Participant Demographics and Participant Ratings of the Course

Correlations between demographic descriptors and participants' responses to questions pertaining to the PSEP course are presented in Table 1. Correlations significant at the .01 level are as follows:

- There were inverse relationships between age and the variables “understanding subject matter covered, meeting individual objectives, and adoption of practices.”

- There was a positive correlation between length of service and participants’ ratings for the variable “audiovisuals.”

- An inverse relationship existed between length of service and participants’ ratings for the variable “adoption of practices.”

Correlations significant at the .05 level but not at the .01 level are as follows:

- There was an inverse relationship between age and participants’ ratings for the variable “demonstrations.”

- There was a positive correlation between length of service and participants’ ratings for the variable “subject matter coverage.”

- There was an inverse relationship between participants who made ag applications and their rating for the variable “adoption of practices.”

- There was a positive correlation between participants who made urban applications and their rating for the variable “meeting individual objectives.”

- There was an inverse relationship between participants who made urban applications and their rating for the variable “adoption of practices.”

- Commercial applicators had a greater likelihood of giving higher ratings for the variables “overall rating of program” and “handouts” than did noncommercial applicators.

Table 1. Correlations between participant demographics and participant ratings of the course

		Correlation Coefficients and Significance Level						
Variable		Overall Rating of Program	Handouts	Demonstrations	Audio-visuals	Subject Matter Coverage	Meeting Individual Objectives	Adoption of Practices
Age	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	-.041* .035 1,960	NS	**-.053**** **.006** **1,960**	**-.052**** **.006** **2,020**	**-.064**** **.001** **1,961**
Level of Education	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	NS	NS
Length of Service	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	**.061**** **.002** **2,003**	.044* .035 1,935	NS	**-.069**** **.001** **1,936**
Employees in Company	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	NS	NS
Ag Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	NS	-.069* .010 1,377
Urban Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	.057* .035 1,344	-.062* .025 1,291
Commercial/ Noncommercial	Correlation coefficient Sig. (2-tailed) *n*	-.078* .030 769	-.072* .035 845	NS	NS	NS	NS	NS

****Correlation is significant at the .01 level (2-tailed).**

*Correlation is significant at the .05 level (2-tailed).

NS: Correlation is not significant at the .05 (2-tailed) or 0.01 (2-tailed) levels.

Correlations between Participant Demographics and Participant Ratings of the Speaker

Correlations between demographic descriptors and participants' responses to questions pertaining to the PSEP speakers are presented in Table 2. Correlations significant at the .01 level are as follows:

- An inverse relationship existed between participant age and overall rating of the instructor.

- Commercial applicators were associated with giving a higher rating for the variable "keeping session interesting" as compared to noncommercial applicators.

Correlations significant at the .05 level but not at the .01 level are as follows:

- There were inverse relationships between age and the variables "speaker stating objectives and communicating material" and "responding to questions."

- A positive correlation existed between those who made urban applications and their rating of the variable "speaker stating objectives and communicating material."

Table 2. Correlations between participant demographics and participant ratings of the speaker

		Correlation Coefficients and Significance Level				
Variable		Overall Rating of Instructor	Speaker Stating Objectives and Communicating Material	Use of Current Information, Materials, and Examples	Keeping Session Interesting	Responding to Questions
Age	Correlation coefficient Sig. (2-tailed) *n*	**-.054**** **.006** **1,969**	-.046* .019 1,979	NS	NS	-.041* .033 2,030
Level of Education	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS
Length of Service	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS
Employees in Company	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS
Ag Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS
Urban Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	.064* .020 1,303	NS	NS	NS
Commercial/ Noncommercial	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	**-.100**** **.005** **789**	NS

****Correlation is significant at the .01 level (2-tailed).**

*Correlation is significant at the .05 level (2-tailed).

NS: Correlation is not significant at the .05 (2-tailed) or 0.01 (2-tailed) levels.

Correlations among Demographic Descriptors

Correlations among demographic descriptors are presented in Table 3. Correlations significant at the .01 level that also had a correlation coefficient ±.300 are as follows:

- As length of service increased, the likelihood the participant performed urban applications increased.
- A positive correlation existed between ag applications and urban applications.

Correlations significant at the .01 level that did not have a correlation coefficient ±.300 are as follows:

- Age was positively correlated with both level of education and length of service.
- As age increased, the likelihood the participant was a noncommercial applicator increased.
- As level of education increased, the likelihood the participant was a commercial applicator increased.
- As length of service increased, the likelihood the participant performed ag applications increased.
- As the number of employees in the company increased, the likelihood the participant was a noncommercial applicator increased.

Correlations significant at the .05 level but not at the .01 level are as follows:

- Noncommercial applicators had a greater likelihood of performing urban applications than did commercial applicators.

Table 3. Correlations among participant demographic descriptors

		Correlation Coefficients and Significance Level					
Variable		Age	Level of Education	Length of Service	Employees in Company	Ag Applications	Urban Applications
Age	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	NS
Level of Education	Correlation coefficient Sig. (2-tailed) *n*	**.130**** **.000** **1,897**	NS	NS	NS	NS	NS
Length of Service	Correlation coefficient Sig. (2-tailed) *n*	**.091**** **.000** **1,947**	NS	NS	NS	NS	NS
Employees in Company	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	NS	NS	NS	NS
Ag Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	**.292**** **.000** **1,381**	NS	NS	NS
Urban Applications	Correlation coefficient Sig. (2-tailed) *n*	NS	NS	**.310**** **.000** **1,299**	NS	**.436**** **.000** **1,249**	NS
Commercial/ Noncommercial	Correlation coefficient Sig. (2-tailed) *n*	**.111**** **.000** **819**	**-.095**** **.003** **781**	NS	**.214**** **.000** **784**	NS	.085* .028 677

****Correlation is significant at the .01 level (2-tailed).**
*Correlation is significant at the .05 level (2-tailed).
NS: Correlation is not significant at the .05 (2-tailed) or 0.01 (2-tailed) levels.

Implications/Recommendations

This study identified several demographic correlations within the Texas A&M AgriLife Extension Service PSEP that can now enable the PSEP to target its programming efforts more effectively. Agricultural applications and urban applications are often considered two different and independent practices. However, with the positive correlation between ag and urban applications, the PSEP can target these together in future programming efforts, knowing that the applicant will likely be performing both. Of the participants surveyed, age, length of service, and applicator status were the three most influential demographic variables. Although there were some positive correlations with increased service and age, most saw a negative correlation. Adoption of practices, meeting individual objectives, instructor ratings, and the rating of subject matter coverage all decreased by increases in either age or length of service.

These findings support those of Vanclay (1992) that older, experienced participants have likely heard, seen, and met the instructors or others teaching the same material and may cause barriers for the programs. These older and/or more experienced participants are also likely to have established a familiar way of doing things and, consequently, are less likely to adopt new practices. Because service and age were positively correlated and showed similar influences, these groups can be targeted together. While PSEP tries to improve its programs by providing current and new information, it should identify and reach out to these older and experienced participants with specialized programming efforts that align with their concerns.

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