



October 2010
Volume 48 Number 5
Article Number 5RIB5

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Does User Age Differ in Perceptions of Online Learning for Certified and Licensed Pesticide Applicators?

Fred Fishel

Associate Professor and Director, Pesticide Information Office
weeddr@ifas.ufl.edu

Jason Ferrell

Associate Professor and Extension Specialist
jferrell@ufl.edu

University of Florida
Gainesville, Florida

Abstract: The University of Florida offers continuing education units through an approved online system to meet recertification standards for applicators of pesticides to renew their licenses. Data comparing an older age group (50 years and older) to a younger group (18 to 49) revealed no age differences in perceptions of our online system for learning as compared to traditional "face-to-face" classes. Our survey showed older and younger applicators to be equally likely to use Web-based learning tools in the future.

Background

Federal and Florida laws require that applicators of pesticides classified as "restricted" be certified and licensed. During the mid-1970's, the U.S. Environmental Protection Agency's (US EPA) Federal Insecticide, Fungicide, and Rodenticide Act (US EPA, 2005) was amended to authorize each state to enact a certification/licensing program for applicators of restricted use pesticides. The regulating agency for this program in Florida is the Florida Department of Agriculture and Consumer Services (FDACS, 2007). Restricted use pesticides are those that are classified as such by the US EPA because they pose a significant risk to humans or to the environment. For a person to become certified to purchase and handle restricted use pesticides, he or she must meet competency standards as demonstrated by passing (70%) mandated examinations.

To keep the license valid, pesticide license holders must accumulate between four and 20 continuing education units (CEUs) every 4 years, depending on license type. In Florida, FDACS is very flexible in the type of CEU programs they will approve (Fishel, 2008). Traditionally, live/face-to-face programs conducted by the University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS) Extension Service have been the most common venue.

Introduction

Extension educational information has continuously increased in availability through the World Wide Web (Muske, Goetting, & Vukonich, 2001). It has been reported that persons with broadband access at home engage in more types of activities online, including obtaining information. In fact, household broadband access more than doubled between 2001 and 2003, while at the same time, dial-up service declined (U.S. Department of Commerce, 2004). From 2003 to 2009, broadband access tripled to 63.5% of all U.S. households (U.S. Department of Commerce, 2010). The trend presents opportunities for Extension professionals to efficiently disseminate information, but it's important to identify the usefulness of the delivery methods. Extension educators commonly question the effectiveness and the perceptions of how users view computer delivery systems as a conduit of information.

Research in New York (Staats, 1995) and Missouri (Warmund & Schrock, 1999) have shown that distance delivery of information to Extension audiences has positive aspects. With a Master Gardener audience, online delivery of an educational program was shown to be as effective as traditional delivery, and there was a linkage between satisfaction with the course and willingness to take another online course (Rost & VanDerZanden, 2002). Overall assessments of licensed pesticide applicators use of online training for continuing education purposes were recently shown to be very positive (Fishel & Ferrell, 2009).

Because delivery of programs to pesticide applicators has historically been live/face-to-face activities, the use of computer applications for this audience is a relatively recent phenomenon. Surveys of approximately 14,000 commercial applicators in Missouri indicated that their access to the Internet increased from 41 to 86% from 1998 to 2004 (Fishel, unpublished raw data). A significant proportion of this audience was older than the age of 50. With an agricultural audience, age had a significant impact on preference for how watershed conservation information was delivered, with younger age groups having a greater preference for computer-based resources than older age groups (Howell & Habron, 2004). These findings support our initial hypothesis.

A survey of southeastern agricultural producers examined age and Internet adoption. The data generated from the survey suggested that age played a key factor in the adoption of the Internet for conducting farm business (Hall, Dunkelberger, Ferreira, Prevatt, & Martin, 2003). An early assessment study with pesticide applicators conducted in Oregon compared interactive computer with traditional classroom training. It was concluded that this audience's short-term learning by interactive computer training compared to traditional delivery methods was equal, although the interactive computer training required 50% less time (Shenk, 1999). Although not quantified, that study also observed enthusiasm among older attendees for computer-based learning. Since that study, online pesticide applicator CEU credit opportunities have been developed by private industry and at Land Grant Universities in Washington (WSU, 2010) and Florida (Ferrell & Fishel, 2007).

The objectives of this article are three-fold for comparing two age groups (18 to 49 years and 50 years and older) of licensed pesticide applicators:

- To determine the proportion of our audience's experience with online educational opportunities,
- To determine if first-time users of online learning technology would likely use such a program in the future, and
- To compare their perceptions of our online system to traditional live/face-to-face learning.

Our initial hypothesis is that the younger age group has more experience, would be more likely to use online learning technology in the future, and would perceive online learning to be just as effective as live/face-to-face learning.

Methodology

The UF/IFAS Pesticide Information Office development effort was initiated during 2006, became publicly available later that year, and is described in Ferrell & Fishel, (2007). A preliminary survey instrument administered with our online system during its initial year was designed to provide input for logistical purposes (data not reported). Our preliminary questions of concern involved applicator acceptance, ease of use, and software capability. Results were overwhelmingly positive.

A follow-up survey instrument was put into place during 2008 to better ascertain applicator perceptions of effectiveness and likelihood of using web-based learning in the future. Our survey also asked for date of birth with our objective to determine perceptions comparing age groups. In order to receive the CEU, users of our system were required to complete the brief survey. From the pool of users of our online system since 2008, 50 surveys were randomly selected for each of two age groups: 18 to 49 years and 50 years and older. Our questionnaire asked two yes/no response questions (Table 1) and contained four statements using a 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). Data were analyzed using Student's *t*-test to compare Likert scale means. Likert scale response means for each age group, *t* and probability values, along with their standard deviations are presented for comparing age groups (Table 2).

Table 1.

Pesticide Applicator Experience With Online Learning Tools and Likelihood of Future Use by Age Group

Survey Question	Age Group (Years)			
	18 â 49 (n = 50)		>50 (n = 50)	
	Yes	No	Yes	No
Is this the first Web-based tutorial that you have completed?	37	13	30	20
If yes, do you plan to use Web-based learning tools in the future?	36	1	28	2

Table 2.

Pesticide Applicator Perceptions of the University of Florida's Online Learning by Age Group

Survey Statement	Age Group (Years)		<i>t</i>	p	SD
	18 â 49 (n = 50)	>50 (n = 50)			

	Response Mean ¹				
I found this tutorial to be an effective method of presenting information.	4.64	4.51	-0.898	0.371	0.735
I found this tutorial to be an effective method of learning.	4.61	4.55	-0.361	0.719	0.748
I found this tutorial to be just as effective for learning as traditional "face-to-face" classes.	4.36	4.23	-0.746	0.458	0.898
I feel comfortable using this Web-based tutorial as a way of learning.	4.71	4.53	-1.30	0.195	0.705
¹ Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree).					

Results and Discussion

The first two questions of the survey attempted to find out licensed pesticide applicators' experience using Web-based learning tools and the likelihood of them using it in the future. Our hypothesis was that the younger aged group would have far more initial online experience and be more open to use online learning than the older group. The survey findings demonstrated the opposite. A comparison showed that 60% of the younger group was first-time users of online learning programs, compared to 74% of the older group. A possible explanation is that several private industry groups had established online opportunities for licensed pesticide applicators prior to the development of the University of Florida's. Those in the 50 or older group may have taken courses from those private providers.

Nevertheless, online learning was a new experience for most. A positive perception from an Extension educator's viewpoint is that of all of these 67 first-time users, only three of them do not plan to use Web-based learning tools in the future. With our system, many of these applicators took multiple tutorials. One applicator took a total of 21 tutorials, while another took 17. Although not directly asked, this may have been due to the fact that some of these applicators were very close to reaching their license expiration dates.

The final section of the survey compared the age groups' perceptions of online learning. The first three perceptual statements in the survey addressed the effectiveness of Web-based learning tools. There was no overall significant difference in the perceptions between the age groups of licensed pesticide applicators. Both groups either strongly agreed or agreed that the online tutorial they took was an effective method of presenting information. Likewise, both groups had a similar opinion that the method of learning was effective. Concerning the effectiveness of Web-based learning tools when compared to traditional "face-to-face" classes, responses were slightly more variable, but they generally agreed that it seemed just as effective.

Although we would have preferred to quantify these results using pre- and post-tests, our current system has limitations in that it is not linked into a learning management system, thus we are not able to save and retrieve our tutorials' pre- and post-test scores. Previous studies have quantified data using pre- and post-tests for comparing computer-based learning to traditional classes and found no differences in learning turfgrass management technology, although age was not taken into account (Mayfield, Wingenbach, & Chalmers, 2006). This may be true, at least with their short-term learning. Long-term learning effectiveness would

require future study.

The final survey statement addressed comfort levels of using Web-based learning tools. Because we have invested significant effort in this project, it was reassuring to see the response level regarding applicator comfort in using such a system for learning. Our initial hypothesis was that older licensed pesticide applicators would not be as accepting or comfortable with taking online classes as younger licensed pesticide applicators. The results of our survey show that there is an equal level of comfort within both age groups for this style of learning. At least a partial explanation may be that, regardless of age, licensed pesticide applicators find online continuing education to be a convenient method for completing their requirements.

Implications

Because certification and licensing of pesticide applicators are mandated by law, opportunities to provide educational programs will always exist. Web-based learning presents a medium for Extension educators to effectively teach relatively technical subject matter. The technology is also an opportunity for Extension educators to increase their clientele base while maximizing cost and time efficiency. Our experience has shown that licensed pesticide applicators seeking informational courses are very willing to take the online route. The results of the survey show that licensed pesticide applicators are comfortable with online learning tools, regardless of age, and are likely to use these tools in the future. These findings should be an indication to Extension educators that online technology presents great potential and should be considered as a component of their programming for all age groups.

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