

## Innovative Virtual Pesticide Recertification Webinar Series Achieves Success during the COVID-19 Pandemic

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### Abstract

Pesticide safety education programs (PSEP) for recertification were halted due to the COVID-19 pandemic in 2020. However, pesticide applicators needed relevant, easy access to educational material to maintain their pesticide licenses through continuing education credit (CEC) programs. University of Idaho (UI) PSEP addressed applicator needs by delivering online webinars that met state CEC regulations. The UI PSEP staff launched a project to measure the demographics of attendees, online program effectiveness, and impacts of using online delivery for PSEP recertification programming.

**Keywords:** applicator recertification, continuing education credits, online webinars, pesticide safety education programs, Zoom

### Introduction

The coronavirus pandemic (COVID-19, caused by the novel SARS-CoV-2 virus) in early 2020 led to required university and business shutdowns and limited restrictions for personal interactions, including in-person meetings. Most Extension and other educational programs, including necessary pesticide safety education, could not be offered in this traditional face-to-face manner. As a result, the University of Idaho (UI) Extension Pesticide Safety Education Program (PSEP) was tasked with rapidly developing a COVID-19 compliant method to deliver pesticide safety education recertification programs for the required continuing education credits. Pesticide applicators in Idaho depend on the UI Extension program to deliver workshops, classes, and seminars throughout the state that qualify attendees for pesticide recertification credits. These credits are required for them to stay current and

maintain their pesticide license per the Idaho pesticide and chemigation law (Idaho Code Title 22, Chapter 34).

The Idaho Pesticide and Chemigation Rules, administered by the Idaho State Department of Agriculture (ISDA), state that, to maintain an active pesticide license, private applicators must successfully complete six recertification credits and professional applicators must successfully complete 15 recertification credits during a two-year recertification period. The recertification or continuing education credits (CEC) must be approved by ISDA as accredited pesticide education and equate to 60 minutes of education per credit. All professional applicators must complete their CEC by December 31 of the year their license expires, and private applicators in March, July, and October, depending upon their last name. Before 2020, Idaho Pesticide and Chemigation Rules allowed applicators to obtain only 50% of recertification credits from an online source. Applicators had to get the remainder from in-person live classes, workshops, and seminars. In response to the pandemic, in the fall of 2020, ISDA revised the Idaho Pesticide and Chemigation Rules and allowed applicators to earn 100% of the required recertification credits through an online delivery mechanism (Idaho Administrative Procedures Act [IDAPA] 02.03.03).

Because all professional applicator CEC must be completed by December 31, UI Extension programming is traditionally delivered in the fall and early winter before the holidays. This delivery schedule works well for agricultural and urban applicators who typically have time to attend classes at that time of the year. For those reasons, the UI Extension PSEP needed to develop a process to deliver CEC that would meet clientele needs before the December 31 recertification deadline and accommodate applicators' schedules. Additionally, the UI PSEP needed to develop a protocol for registering attendees, collecting pesticide applicator license numbers, and verifying attendance for the 60-minute timeframe to qualify for the education credit. After the state agency (ISDA) regulatory logistics were approved, the UI launched the virtual pesticide education project. The purpose of the project was to deliver a webinar series for pesticide recertification credits and design and test the acceptance and effectiveness of an online PSEP for recertification credits. The project included a survey of participants, approved by the Institutional Review Board (IRB), to measure demographics, effectiveness, and impacts of the new webinar series.

## **Methods**

### **Selection of Zoom as the Webinar Delivery Method**

UI Extension PSEP selected Zoom video conferencing as the online platform to deliver the pesticide recertification seminars. We recognized that many individuals had already used Zoom for work and personal online communications during the COVID-19 shutdown. It was rated the ninth easiest video conferencing software in 2020 (G2, 2021). In addition, the University of Idaho already held a professional Zoom license that provided faculty and staff access and included webinar capabilities for the instructor. After several hours of self-training via the Zoom.us website, we selected the Zoom webinar format as the best option for delivering pesticide recertification education seminars to anticipated groups of 50 or more adult clientele.

Zoom webinar is a one-way audio and video communication platform that exists between the presenter and attendees. This platform allows attendees to ask questions or make comments by typing them into the Q&A and chat features of Zoom. It automatically mutes and turns off video for all class participants, reducing the potential for background noise and other distractions from attendees. Bultemeier et al. (2021) described in more detail the features of Zoom and differences between Zoom meetings and Zoom webinars.

## **Webinar Development**

A team comprised of Extension PSEP faculty and Extension educators collectively developed and marketed a University of Idaho Extension pesticide webinar series for Idaho pesticide licensed applicators. The webinar series consisted of 12 60-minute webinars, based on four themes, that provided a total of 12 CEC offered by UI Extension. The four themes were: 1. Safety First, 2. Urban Integrated Pest Management (IPM), 3. Weed Management, and 4. Environmental Impact of Pesticides. There were three webinars for each theme. Topics and speakers were discussed and assigned by the team of seven Extension faculty as mentioned above. The Zoom platform provided opportunities to utilize speakers from other organizations and states, enhancing educational offerings. Webinars were provided by UI and Washington State University Extension educators, ISDA, and Idaho Department of Health and Welfare. One webinar per week was delivered October through November 2020. Two webinars per week were delivered in December to complete the series before the end-of-year holidays and to meet the December 31 recertification deadline for professional applicators.

## **Features of the Webinar Format**

All attendees were provided detailed instructions at the beginning of each webinar on how to use the Zoom polling, Q&A, and chat features of the webinar format. Zoom polling was used throughout the webinar to encourage engagement and document participation, as described below in the regulatory process. We also used Zoom polling at the end of the webinar to launch a survey developed to assess project demographics, effectiveness, and impacts. UI PSEP faculty served as webinar facilitators. All attendees were provided simple pre-webinar questions to test the polling feature on their devices and increase their confidence. On occasion, some attendees needed additional assistance with Zoom features. The webinar facilitators handled these needs individually through the chat feature. In some cases, a Zoom update on attendees' devices was necessary for all features to function properly. This typically required only a few minutes, allowing the attendee to return quickly to a session and actively participate in the webinar and Zoom polling.

## **Regulatory Process**

The UI PSEP team developed webinar regulatory attendance protocols that were approved by ISDA. Each webinar presenter was asked to submit three questions pertaining to their topic. Zoom polling was used by asking these three questions to attendees, at random times, throughout the webinar. All attendees were required to answer these questions during the 60-minute webinar to receive the one CEC that was offered for that session. The purpose of the random polling questions was to ensure, to the best of our ability, that the pesticide license holder was present and engaged for the 60-minute presentation timeframe. Due to the large size of the

webinar classes, which averaged 150 attendees, it was not practical to use cameras for video checks before or during the webinars.

### **Attendee Registration**

The webinars were advertised through direct emails to licensed pesticide applicators, county Extension office posters, and the University of Idaho Pest Management Center website. Attendees were required to preregister for each webinar, providing their name, email address, and pesticide license number. Preregistration was completed using an internal UI system called Marketplace. Registration allowed the UI PSEP to collect user information and a small class fee of \$10 for each webinar. The registration fees were used to support the UI PSEP statewide program. The UI PSEP team prepared an Excel® spreadsheet that compiled the attendee's name, email address, Idaho pesticide license number, and responses to the three required in-webinar questions. The Excel® spreadsheet was submitted to the ISDA pesticide licensing section to verify the attendees' pesticide recertification credit. An email was sent to all attendees who successfully completed the session to confirm they earned one pesticide recertification credit. Participants were required to save the email for submission to ISDA with their license renewal application, as proof of their CEC completion.

If a webinar attendee had technical difficulties with Zoom and the polling questions, they were required to email UI PSEP staff or put a note in the chat box, with the answers and time the question occurred on the Zoom webinar. This process allowed the UI PSEP to document that the attendee was present to hear and correctly answer the questions, thus validating their time in the webinar to meet ISDA regulatory requirements.

### **Survey**

A post-webinar voluntary survey was developed by UI PSEP faculty and approved by the IRB. The survey was designed to collect demographic information on the webinar participants and measure the program's effectiveness and impact. This project focused primarily on the efficacy of delivering pesticide recertification programs online and determining if the adult clientele would utilize the online educational offerings.

The survey was delivered using the Zoom polling feature at the conclusion of each webinar. Participants had the option of leaving the Zoom meeting without participating in the survey. At the beginning of the webinar session, all attendees were provided information about the post-webinar survey. It was made clear to participants that the survey was voluntary and that they must be at least 18 to complete it. The survey participants were not obligated to answer all the questions. We assumed all attendees were at least 18, since applicators must be 18 years old to hold a pesticide license in Idaho (Idaho Code Title 22, Ch 34, Sec 22-3409). Survey completion was not required to obtain a recertification credit (CEC).

### **Survey Data Analysis**

As mentioned previously, there were three webinars in each theme, and the survey data were combined within each theme for analysis (Table 1). Themes were selected by the team of UI Extension educators who participated in this project. The selection

was based on input from clientele regarding pesticide safety education topics of interest.

**Table 1.** Number of webinar attendees by theme.

| <b>Webinar theme</b>               | <b>Number of attendees</b> |
|------------------------------------|----------------------------|
| Safety first                       | 350                        |
| Urban IPM                          | 578                        |
| Weed management                    | 752                        |
| Environmental impact of pesticides | 626                        |
| <b>Webinar series total</b>        | <b>2,306</b>               |

Survey results were then summarized into one-way and two-way contingency tables, and chi-square ( $\chi^2$ ) tests of association between specified survey questions or theme type were carried out using categorical modeling. For some questions, the possible answers to questions were combined when the level of response was low. Where these occurred, they are indicated in the results below. All statistical analyses were carried out using statistical analysis system (SAS) v. 9.4 (SAS Inc., Cary, N.C.).

Not all webinar attendees answered all survey questions. Table 2 indicates the number of survey responses per question.

**Table 2.** Number of webinar respondents by survey-question topic.

| Demographics                   |                           |                    |                            |                               |                          |                   |
|--------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|--------------------------|-------------------|
| Question                       | Answers                   |                    |                            |                               |                          |                   |
| Age (in years)                 | 18-35                     | 36-45              | 46-55                      | 56-65                         | Over 65                  | Frequency missing |
|                                | <b>254</b>                | <b>269</b>         | <b>264</b>                 | <b>296</b>                    | <b>237</b>               | <b>36</b>         |
| Location in Idaho              | Eastern                   | South-eastern      | South central/Magic Valley | Southwestern /Treasure Valley | Northern                 | Frequency missing |
|                                | <b>114</b>                | <b>216</b>         | <b>228</b>                 | <b>538</b>                    | <b>178</b>               | <b>53</b>         |
| Community size                 | Rural                     | Town under 10,000  | Small city 10,000-30,000   | Medium city 30,000-50,000     | City greater than 50,000 | Frequency missing |
|                                | <b>494</b>                | <b>235</b>         | <b>171</b>                 | <b>137</b>                    | <b>271</b>               | <b>48</b>         |
| Applicator type                | Professional—agricultural | Professional—urban | Private                    |                               |                          | Frequency missing |
|                                | <b>624</b>                | <b>296</b>         | <b>390</b>                 |                               |                          | <b>42</b>         |
| License renewal year           | Year one                  | Year two           |                            |                               |                          | Frequency missing |
|                                | <b>545</b>                | <b>759</b>         |                            |                               |                          | <b>50</b>         |
| Device used                    | Computer                  | Tablet             | Smartphone                 |                               |                          | Frequency missing |
|                                | <b>933</b>                | <b>148</b>         | <b>230</b>                 |                               |                          | <b>44</b>         |
| Webinar effectiveness          |                           |                    |                            |                               |                          |                   |
| Question                       | Answers                   |                    |                            |                               |                          |                   |
| Worth their time               | Yes                       | No                 | Unsure                     |                               |                          | Frequency missing |
|                                | <b>1,303</b>              | <b>13</b>          | <b>25</b>                  |                               |                          | <b>15</b>         |
| Convenient                     | Yes                       | No                 | Unsure                     |                               |                          | Frequency missing |
|                                | <b>1,193</b>              | <b>28</b>          | <b>102</b>                 |                               |                          | <b>33</b>         |
| Webinar impact                 |                           |                    |                            |                               |                          |                   |
| Question                       | Answers                   |                    |                            |                               |                          |                   |
| Beneficial/saved resources     | Yes                       | No                 | Unsure                     |                               |                          | Frequency missing |
|                                | <b>1,076</b>              | <b>56</b>          | <b>191</b>                 |                               |                          | <b>33</b>         |
| Will enroll in future webinars | Yes                       | No                 | Unsure                     |                               |                          | Frequency missing |
|                                | <b>1,298</b>              | <b>6</b>           | <b>26</b>                  |                               |                          | <b>26</b>         |

## Results and Discussion

### Demographics of Attendees

Survey data was evaluated to detect associations with age, license type, locations, and webinar themes. The largest group that participated in the webinars was professional agricultural applicators (n=624), followed by private applicators (n=390), then professional urban applicators (n=296), for a total of 1,310 responding to this survey question on license type. Survey data also showed that southwestern Idaho had the greatest number of participants with 41%, followed by south central Idaho, southeastern Idaho, northern Idaho, and eastern Idaho. Southwestern Idaho is the most populated area of the state. Attendees in the second year of their recertification period comprised 58% of the total surveyed. The remaining 42% were in the first year of their recertification period.

No association was detected between the applicator type and pesticide license renewal timeline ( $p=0.0652$ ). However, the community size impacted who attended webinars based on their pesticide license renewal timeline ( $p<.0001$ ). All categories of community size showed an increase of webinar attendance in the last year of the recertification period except for the community size of less than 10,000 (Figure 1). Community size was defined as rural, less than 10,000 people, small-sized city of 10,000-30,000 people, medium-sized city of 30,000-50,000 people, large-sized city greater than 50,000 people, and an Other category (Figure 2), which represented attendees from Oregon and Washington state.

**Figure 1.** Recertification year and community size.

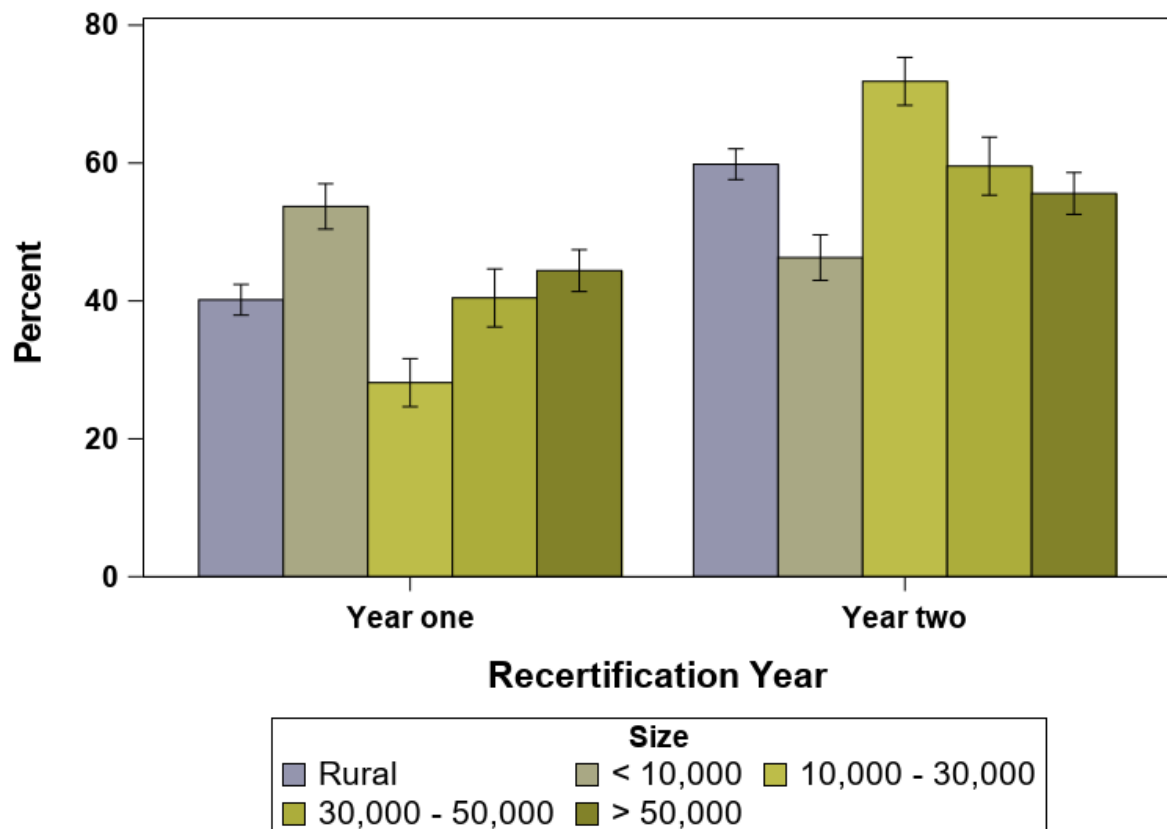
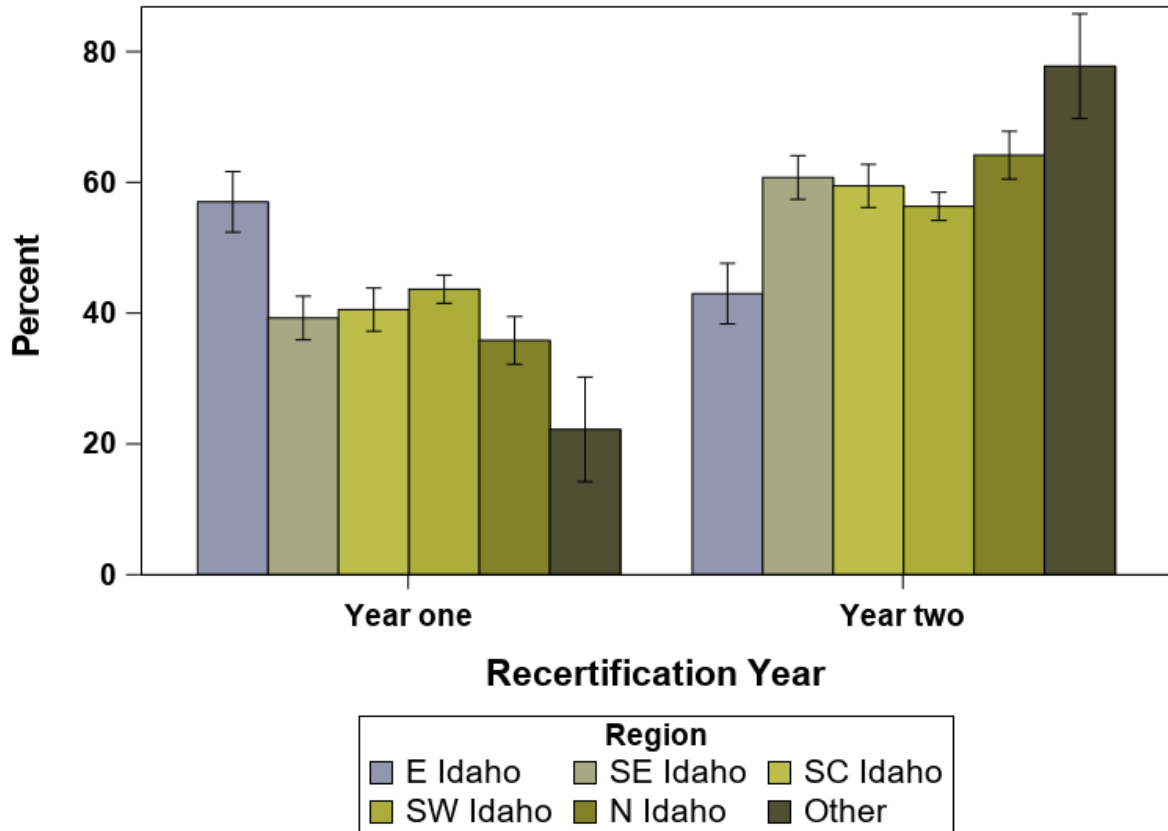


Figure 2 shows that the part of the state attendees lived in affected the year of the recertification period ( $p=0.0019$ ). Attendees were asked to identify what area of Idaho they are from, based on the five areas where UI PSEP programs are traditionally delivered. An assumption would be that northern and southeastern Idaho are more remote locations in a large state like Idaho, making it harder to participate in face-to-face pesticide classes there. Applicators from these areas may have difficulty finding pesticide recertification classes they can attend during their two-year recertification period to fulfill their CEC requirements. The applicators from these areas of the state took advantage of the online educational opportunity during the second year of the renewal period.

**Figure 2.** Recertification year and location.



There was a detectable association between the type of pesticide applicator and the webinar theme they attended ( $p=0.0039$ ). Four responses of “Don’t have a license” were omitted from analysis. Professional agricultural applicators were more interested in the Safety First and Environmental Impact of Pesticides themes. The professional urban applicators indicated they were most interested in the Safety First and Urban IPM themes, while private applicators were most interested in Weed Management (Figure 3). These 12 webinars were offered over a seven-week period, advertised to all applicators, and divided by theme. An assumption was made, at the beginning of this project, that applicators would select the webinars of interest to them, based on the theme. Other outside factors were not addressed with the survey.



**Figure 3.** Webinar theme and applicator license type.

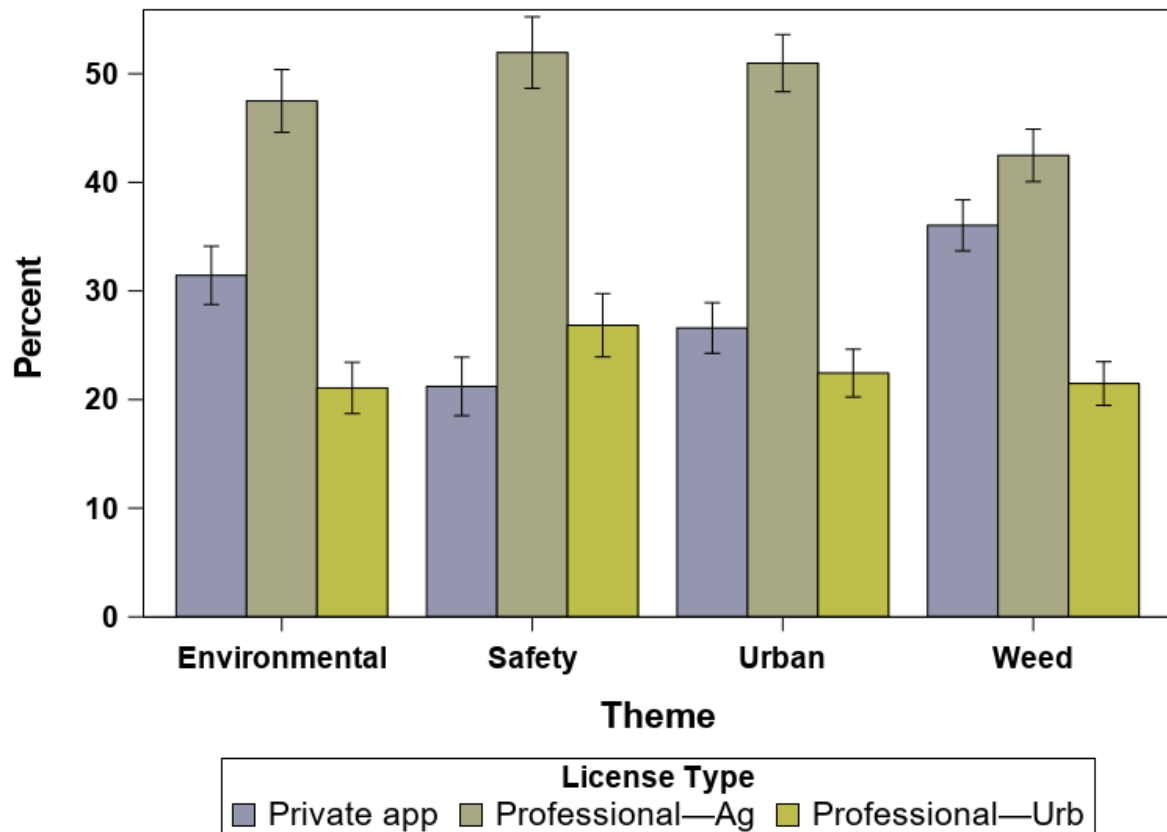
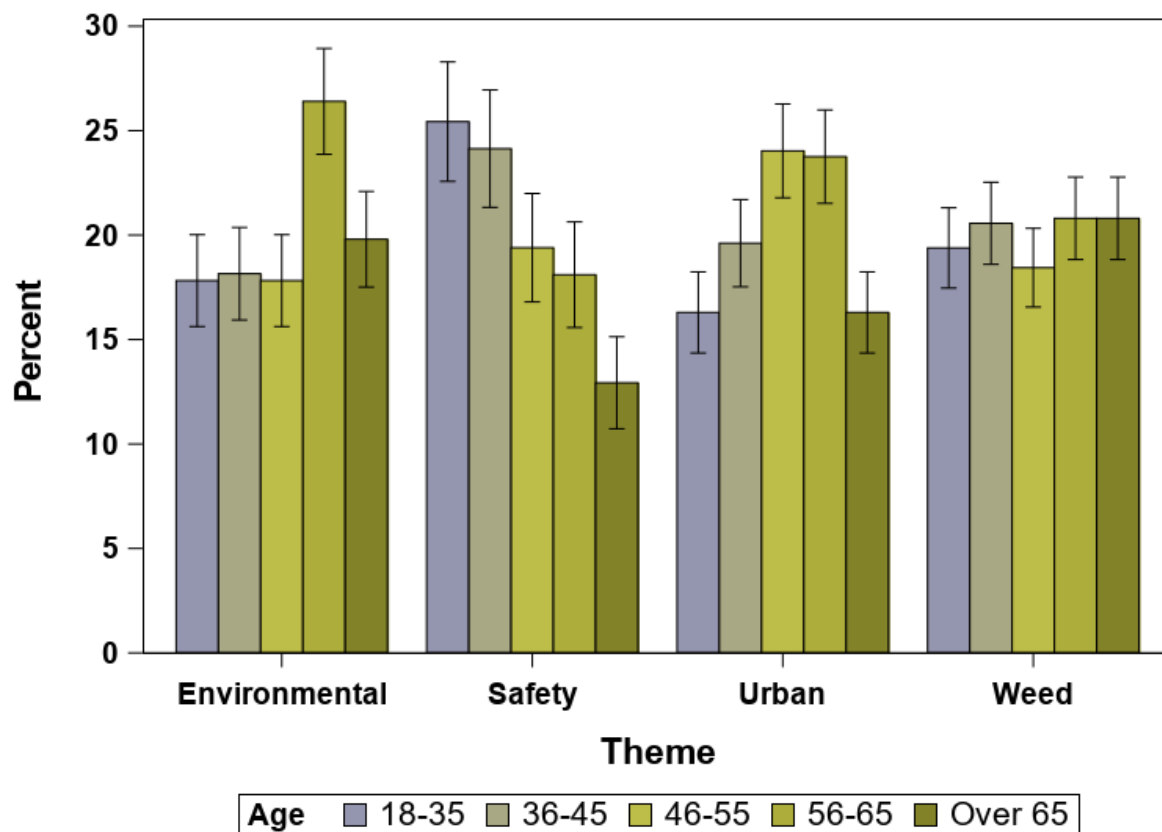
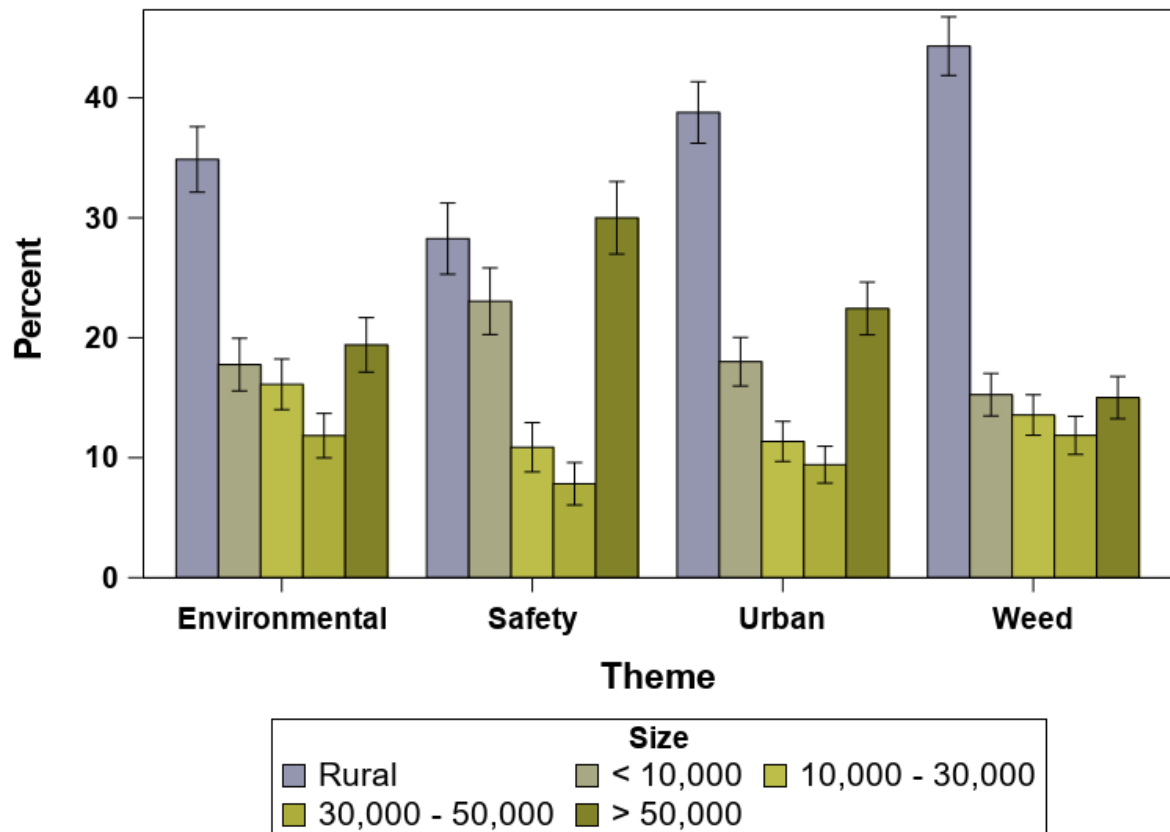


Figure 4 shows an association between the age of the applicators and which webinar theme they attended. The age categories of 18-25 and 26-35 were combined in this analysis due to limited numbers of attendees in those age groups. The younger to middle-aged participants had more interest in the Safety First theme. The older age groups were more interested in the Environmental Impact of Pesticides theme.

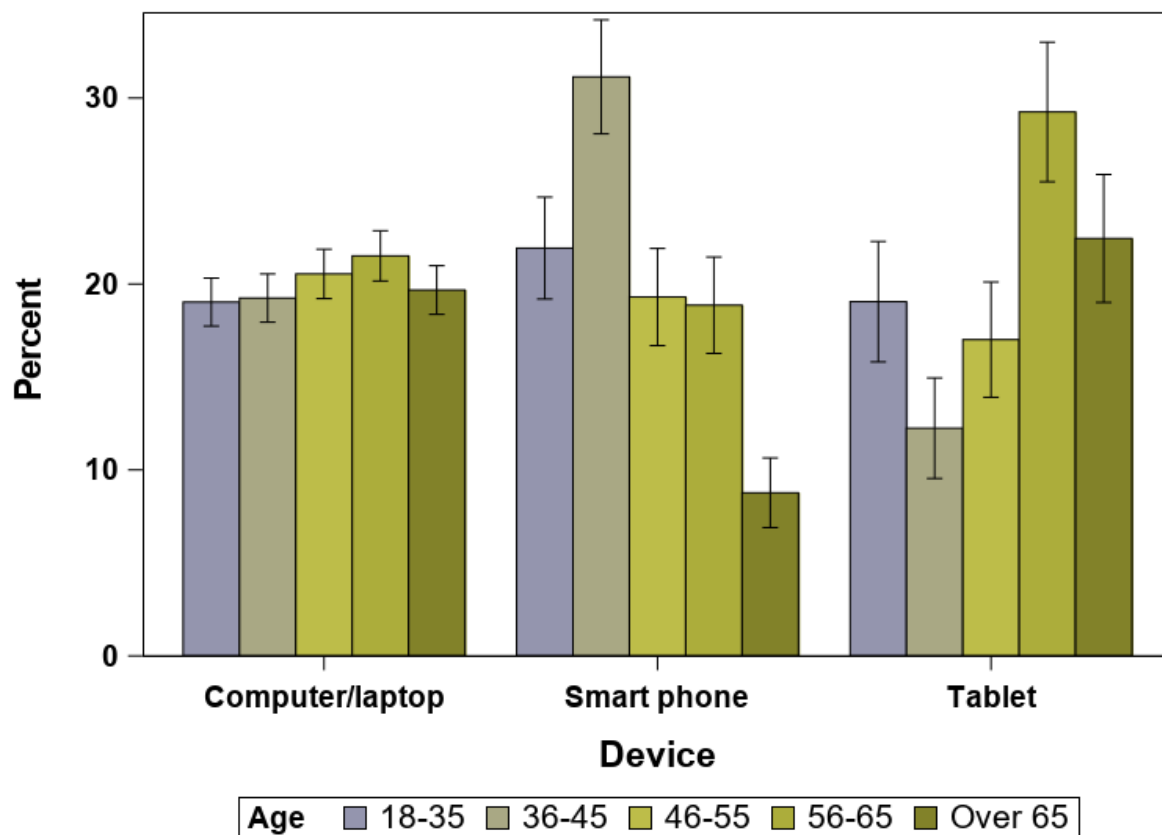
**Figure 4.** Webinar theme and applicator age.

There was a strong association between the community size that the applicator resided in and the webinar theme selection ( $p < .0001$ ). The applicators from rural areas were more likely to attend webinars in the Weed Management theme and had lower attendance in those webinars related to Safety First. Those from the larger cities favored the Urban IPM theme followed by the Safety First theme (Figure 5).

**Figure 5.** Webinar theme and applicator’s community size.



The survey data did demonstrate a strong association between age of the applicators and the type of device they used to view the webinars ( $p < .0001$ ). Laptops were equally used by all age groups, but smartphones were used substantially more by those in the 36–45-year-old age group and tablets more by 56–65-year-olds (Figure 6).

**Figure 6.** Applicator age and device used.

### Effectiveness of the Program

The most popular webinar theme was Weed Management, followed by Urban IPM, Environmental Impact of Pesticides, and Safety First.

Data show that 90% of attendees surveyed indicated they thought the online format was convenient, and 97% believed the pesticide recertification webinars were worth their time. Since there were no in-person educational opportunities, we might expect that there was an urgent need for applicators to obtain their CEC through an online format. Most of the applicators viewed the webinars from an office or their homes.

### Impacts of the Program

The fall 2020 webinar series resulted in 2,306 pesticide recertification continuing education credits issued to Idaho pesticide applicators compared to an average of 600 applicators for annual in-person recertification programs (UI Extension Digital Measures, 2020). The survey was completed by 1,356 pesticide applicators, and not all answered every survey question (Table 2.). An average of 98% indicated that they would plan to attend future online pesticide recertification webinars hosted by UI, and an average of 82% indicated that the online webinar format saved them time and money. Our data suggests that online delivery of pesticide recertification programs is viewed as favorable by our applicators, and it has a larger statewide impact than the traditional in-person programming in past years.

## Conclusion

We did not anticipate the overwhelming interest and participation from our clientele in the use of online training for obtaining CEC in pesticide safety education. Because of the university and business shutdowns during the COVID-19 pandemic, clientele could only obtain their CEC through online resources. This may account for the large attendance numbers, compared to previous years and in-person seminars. We had assumed that many pesticide license holders would be in the second (last) year of their recertification period. However, our survey data indicated that nearly as many attendees were in their first year as in the second year of the recertification period. Therefore, they did not have an urgent need to obtain the necessary CEUs to maintain their pesticide applicator's license. This suggests that attendees liked the convenience and the cost savings of attending online educational programming. The following is a list of observations resulting from this project and the survey analyses.

### Advantages

- The online webinars gave easy access for educational opportunities to pesticide applicators across the state of Idaho.
- Pesticide applicators saved time and money by not traveling long distances to attend in-person seminars.
- Pesticide applicators from rural areas and smaller towns were more likely to be in the last year of their recertification period before signing up for webinars. We assume they had prior limited access to recertification program opportunities, compared to those living in larger cities.
- Most attendees were able to connect to Zoom and use all its features. Data showed that younger applicators used their cell phones more than older applicators, and middle-aged to older applicators used tablets.
- The online format provided access to a broader range of speakers because speakers were not required to travel for their presentations.

### Disadvantages

- Some applicators were uncomfortable with online technology and struggled with the sign-in process for the Zoom webinars.
- UI PSEP staff spent several hours individually coaching the few people who did not understand Zoom and its functions.
- Because cameras were not used, it was impossible to gauge the level of applicator engagement during the entire webinar.
- The large number of attendees made certifying and reporting attendance to the regulatory agency (ISDA) challenging.

Many of the advantages and disadvantages observed from this project are similar to those reported by Mahler (2021) when teaching online soil fertility courses to traditional university students. It appears that adult learners have similar attitudes as traditional university students regarding online learning.

Since we completed our first webinar series, ISDA has modified the attendance verification process, making it easier and less time consuming for UI PSEP staff to verify attendance. The post-webinar survey has been modified to collect future data on knowledge gained, relevance of the webinar topics to attendees' work, and comparison of knowledge learned from the webinars vs. in-person educational events. These assessments will lead to further program improvements.

To summarize, the UI PSEP online pesticide recertification program successfully provided quality educational programming and recertification credits during the COVID-19 pandemic. The project took much more UI PSEP personnel time and effort for initial planning and preparation, including the ISDA regulatory documentation, than the traditional in-person programming. However, UI PSEP saved money and time traditionally incurred with in-person seminars and statewide travel. UI PSEP is planning more webinar series for summer and fall seasons. We anticipate that the 2020 pesticide recertification webinar project will serve as a platform to provide additional quality, engaging online programs to Extension clientele.

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