Training Older Adults to Resist Scams with Fraud Bingo and Scam-Detection Challenges

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Abstract  
Older adults are disproportionately affected by scams, many of which target them specifically. In this interactive demo, we present Fraud Bingo, an intervention designed by WISE & Healthy Aging Center in Southern California prior to 2012, that has been played by older adults throughout the United States. We also present the Scam Defender Obstacle Course (SDOC), an interactive web application that tests a user’s ability to identify scams, and subsequently explains how to recognize the scams. SDOC is patterned after existing phishing-recognition training tools for working professionals. We present the results of running a workshop with 17 senior citizens, where we performed a controlled study that used SDOC to measure the effectiveness of Fraud Bingo. We outline the difficulties several participants had with completing SDOC, which indicate that tools like SDOC should be tailored to the needs of older adults. Additionally, we discuss how to adapt Fraud Bingo and SDOC for international audiences.

Author Keywords  
Scams, Fraud, Interventions, Older Adults

CCS Concepts  
• Human-centered computing → Human computer interaction (HCI); User studies;
Introduction

Older adults are disproportionately affected by scams and frauds of various kinds. For example, the United States’ Federal Trade Commission reported that in 2018, romance scams resulted in reported losses of $143 million, more than any other type of scam [5]. While the median loss reported per victim was $2,600, it rose to $10,000 for victims that are 70-years-old or older. Prior work has identified factors that correlate with susceptibility to scams, among which age is often cited as a key factor [7, 8, 6]. Researchers found that older adults experience declining sensitivity to untrustworthy information [1, 3] and a reduced ability to detect lies [1, 10]. Studies also highlighted age-related functional brain changes in response to untrustworthy cues [1].

The lack of intervention tools specifically designed for older adults motivated the WISE & Healthy Aging Institute to develop Fraud Bingo—an activity to educate participants about frauds while playing the popular game Bingo—which has since been recommended by federal and state governments throughout the United States for use at senior centers (e.g., [13]).

We also developed the Scam Defender Obstacle Course (SDOC), an interactive web application, in similar vein to existing training tools used to educate working professionals about phishing scams [9]. Utilizing Fraud Bingo as a scam training, we explored SDOC’s suitability as an evaluation tool during a workshop that involved 17 senior citizens in Santa Monica, California. We found that tools like SDOC that are designed to evaluate and train working professionals to recognize phishing scams are less effective for many older adults. In this paper, we present Fraud Bingo, SDOC, and lessons learned from running both tools with groups of older adults.

Fraud Bingo

Fraud Bingo is an educational game, similar to Bingo. The main difference is that when the bingo caller calls out the number of a square, they also announce the name of an associated fraud or fraud-prevention tip, along with its more detailed explanation on the back of the bingo card. Fraud Bingo was developed and rolled out by WISE and Healthy Aging, who have run dozens of events in Los Angeles County for more than eight years to groups of 30 to 150 participants. Its development was motivated by a need to create an engaging educational tool that could attract large audiences, and in which people of all skill levels and cultures could participate. It builds on bingo’s popularity, and prizes are given out in events help attract audiences. The game has spread by word of mouth to other parts of the United States. It has also been translated to languages other than English, including Armenian, Chinese, Korean, and Spanish. Various incarnations of the game exist, some of which cover frauds broadly, while others focus on specific frauds (e.g., investment frauds).

The majority of frauds and fraud tips that we printed on the Fraud Bingo cards were derived from the original WISE & Healthy Aging Institute’s game. We adapted the game by eliminating the frauds and fraud-prevention-tips that were least relevant to computer security. Moreover, we added computer-security-related prevention tips identified in prior work [4, 8] and advice related to online romance scams, typo-squatting, and techniques that are typically used by scammers to mislead victims. Additionally, we modified Fraud Bingo from a $5 \times 5$ to a $4 \times 4$ square to focus game play on relevant tips and frauds, and to increase the likelihood that all relevant clues would be covered in 45 minutes of play.
Scam Defender Obstacle Course
The Scam Defender Obstacle Course (SDOC) is an online evaluation and training tool that we developed to 1) measure susceptibility to a set of common online fraud schemes; and 2) educate users on scam-warning signs.

SDOC asks participants to imagine that they are handling the affairs of a good friend who is out of the country and away from her computer (Fig. 3). Participants are then shown a series of ten challenges in the form of emails and browser windows that they encounter while using their friend's computer (Fig. 4). Four challenges present legitimate correspondence with actions that should be taken—for instance, the gas company sending a notice that the payment for service was declined and the balance must be paid. The other challenges present common, real-world scams that include a range of lures to get users to click links, open attachments, or otherwise take actions that could lead recipients to be defrauded. For each of these challenges, participants are asked to indicate what actions they would take (e.g. “Ignore and delete email”, or “Click on link to update billing information”). Participants are also presented free-form text boxes to explain their choices.

Lessons from our Bingo & SDOC Workshop
We ran a two-hour workshop whose intended purpose was to serve as a controlled study evaluating the effectiveness of Fraud Bingo as an intervention technique. The event was free and advertised and open to the general public. Participants were informed that they would participate in Fraud Bingo and in a computer training. Overall, 17 older adults participated in the workshop. They were divided into two groups. One group of eight participants began the workshop in a computer lab where they tried their hand at SDOC. Eight additional participants began the workshop in an adjacent room where they played Fraud Bingo. After 50 minutes, the two groups switched rooms, and participated in the opposite activity. An additional participant arrived at this time and participated only in SDOC. Eight of the 17 participants were part of a class hosted by WISE & Healthy Aging for individuals experiencing early-stage memory loss. These participants were split evenly between both groups.

Running this workshop taught us valuable lessons about how to run an improved version of our study in the future. We share those insights below.

Running Fraud Bingo
When asked, participants reported being satisfied with the experience of playing Fraud Bingo, or made no comment. We observed several reasons for which Fraud Bingo works well as an educational tool for older adults. First, the game of Bingo exists in various incarnations throughout the world and is easily learned. At least three participants had never played Bingo before our event, yet they were able to participate in our workshop without any difficulty. Second, the activity was inclusive—even participants with memory loss and other forms of cognitive decline were able to participate.
effectively. Third, via interactions throughout the workshop, participants were able to contextualize frauds for one another by relating experiences they have had. Such forms of cooperative learning have been shown to make educational activities effective [14].

Running SDOC
Our workshop represented the first occasion on which senior citizens had tried out SDOC. The course was successful in certain ways, but the workshop also taught us several lessons in how to improve upon SDOC’s design.

On the positive side, participants who were able to complete the SDOC (about half), reported enjoying the activity. Furthermore, SDOC increased participants’ confidence in their knowledge, as several reported that it “reinforced what they already knew.” This can potentially motivate the participants to adopt secure behavior in the future [11].

At the same time, the workshop highlighted several limitations of SDOC that should be addressed to improve its applicability for educating older adults. To mention some: 1) The emails may have been long for certain participants, some of whom had difficulties scrolling through and answering the subsequent questions (especially participants with cognitive decline); 2) Participants were biased to mark emails as scam (potentially because the rate of scam was higher than what would be expected in practice [12]); and 3) Free-form answers took up time (as certain participants had difficulty typing) and left too much room for interpretation. These limitations may also be relevant for other educational tools in the vein of SDOC (e.g., [9]).

Adaptations for a Global Audience
To serve the needs of international audiences, Fraud Bingo and SDOC should be adapted to local needs (e.g., certain frauds are mostly encountered in specific parts of the world [2]). Fraud Bingo has already been translated into several languages, which is a good first step, yet the clues and tips themselves are still tied to scams that prey upon older adults in the United States. Fortunately, existing bingo-card generation software makes it easy for advocates for older adults replace US-specific scams with local equivalents, while preserving tips that are universally applicable.

Similarly to Fraud Bingo, SDOC can be easily adapted to include scams that are relevant to the region and culture of the participants. In general, scams that prey upon similar fears tend to exist across many cultures, yet customization is necessary, as much of the educational value of SDOC lies in its ability to expose participants to scams that they are likely to encounter in practice. Localized patterns of computer or device usage must also be considered. For instance, in countries where older adults are more likely to use mobile devices than computers, scam-detection training should focus on mobile devices.

Conclusion
In conclusion, we found Fraud Bingo to be an effective training tool for older adults that span a wide range of cognitive abilities. While SDOC was appreciated by some older adults, it needs to be adapted to different skill levels, particularly in a workshop setting. In addition to adopting design guidelines for improved usability, we advocate that similar training tools be of flexible duration so that participants can complete as many or as few challenges as they can get to in a set amount of time and still receive feedback on their performance.

REFERENCES


