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# **Pest Private Eye: Using an Interactive Role-Playing Video Game to Teach About Pests and Integrated Pest Management**

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**Abstract:** The trend toward encouraging adoption of Integrated Pest Management (IPM) in schools has increased in the last decade. Because IPM helps reduce risk of human pesticide exposure, reduce allergens and asthma triggers, save energy, and protect the environment, it's essential that IPM awareness continue not only with current school administrators, parents, and staff, but with students as well. This article discusses how UNL Extension developed, piloted, and evaluated Pest Private Eye and the Case of IPM in Schools, an educational video game that teaches children about pests and IPM, and potential impacts its lessons will have on future generations.

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## **Introduction**

Encouraging adoption of Integrated Pest Management (IPM) in schools has become increasingly important for ensuring the safety of children and the quality of school environments. Pests, such as cockroaches, and pesticide exposure can exacerbate health-related problems such as asthma and aggravate other physical and behavioral problems (Gouge & Lee-Melk, 2008). Asthma is one of the leading causes of school absenteeism in the United States (U.S. EPA 2008). Through use of sanitation, trapping, and other non- or low-toxic methods, IPM helps reduce the risk of human pesticide exposure, protect the environment, and reduce asthma triggers and allergens.

Improving awareness about IPM in U.S. schools has been ongoing over the last decade. School administration, staff, and parents should learn about IPM and its benefits in promoting a healthier environment. It is equally important for students to know about IPM because they will be responsible for future pest management. Extension has already begun instilling knowledge about IPM into youth through activities such as a science-based service learning program in a Philadelphia middle school, which charges

students with applying IPM to situations in their home and school communities. This approach "creates a learning environment for youth to solve ecological problems by using their own community as the classroom" (Webster, 2006).

Currently, there is a national initiative to implement IPM in all American schools by 2015 (Green & Gouge, 2008). As part of the educational effort, the University of Nebraska—Lincoln (UNL) Extension has created an interactive role-playing video game called Pest Private Eye and the Case of IPM in Schools (Pest PI), which teaches children and adult educators about pests and the tools necessary to successfully control them using IPM.

## Materials and Methods

Interactive games have been used effectively in Extension programs and classrooms. Idaho Extension uses a Jeopardy-style game to teach youth about table etiquette (Petty, Dorie, & Stimpson, 2008). Video games have been used in classrooms to help increase self-confidence and competency in reluctant readers (Adams, 2009) and to teach writing skills (Reinders, 2009).

In early 2006, we developed the initial concept, layout, and script for a point-and-click video game about IPM called Pest PI, and then additional UNL Extension staff developed programming and design. The game targets 4th-6th grade children.

In mid 2006 and 2007, we tested a beta version of Pest PI at Nebraska K-12 schools, public libraries, and 4-H and other camps. In 2007, participants and evaluators who reviewed the game were surveyed. In 2008, we continued efforts to pilot and distribute copies of Pest PI and encourage survey participation; presented at teacher and library conferences; and conducted a game usability study in high school biology classes. During 2008, Pest PI also won the Association for Communication Excellence (ACE) Outstanding Professional Skills Gold Award for Information Technology.

In 2010, an enhanced version of the game, made available through funding from the Environmental Protection Agency, was released. It includes additional rooms to explore, increased challenge levels, and a save game feature. We also developed a Teacher's Guide with IPM classroom activities, a comic book version of Pest PI's adventure, and a website <<http://schoolipm.unl.edu/pestpi/>> that offers a free demo, the survey, and other resources about pests and IPM.

## Results and Discussion

In Pest PI, players take on the role of IPM detective Pest Private Eye (Pest PI). They explore virtual school environments where they learn about pests and pest identification, apply IPM techniques, and ultimately solve the school's pest problems.

Interaction with other characters is another important aspect of Pest PI. By talking to school staff about what pests have been seen, and a pest management professional (PMP) about current pest control methods, players determine what IPM strategies work best. In the real world, this represents the importance of teamwork between PMPs and schools.

**Figure 1.**  
Pest PI Visits with the School Principal



## Pest PI Survey

A post-game survey was developed in 2007 (revised in 2008) to determine what players learned. The survey included questions about pest identification, pest management options, and learning IPM (Table 1).

**Table 1.**  
Results from Pest PI Survey; 2007 (n=162) and 2008-2009 (n=52)

<p><b>Pest Identification</b></p>	<p><b>Participants Indicated:</b></p> <ul style="list-style-type: none"> <li>• Learning about pests was the most frequently reported "favorite part of game" (2007).</li> <li>• 72% remembered rodents, 52% cockroaches, 52% spiders, 47% flies, and 42% wasps/bees as pests (2007).</li> <li>• 87% said either they "totally agree" or "agree" when asked if they now have a better understanding of pests and pest management (2008-2009).</li> </ul>
<p><b>Learning About and Encouraging IPM</b></p>	<ul style="list-style-type: none"> <li>• 73% correctly identified the definition of IPM (2007).</li> </ul>

	<ul style="list-style-type: none"> <li>• 64% listed traps and 52% sanitation as the best understood IPM concepts (2007).</li> <li>• 65% correctly identified the definition of IPM (2008-2009).</li> <li>• 77% said either "totally agree" or "agree" when asked if they would encourage others to use IPM at home or school (2008-2009).</li> </ul>
<b>Pest Management Options</b>	<ul style="list-style-type: none"> <li>• 72% said that knowing there are many ways to control pests was the most important concept learned (2007).</li> <li>• 64% remembered sticky traps, 42% traps/snap traps, 25% sanitation, and 10% vacuuming as control methods (2007).</li> <li>• 73% said that knowing there are many ways to control pests was the most important concept learned (2008-2009).</li> <li>• 87% said either they "totally agree" or "agree" when asked if they now have a better understanding of pests and pest management (2008-2009).</li> </ul>

## Pest PI Usability Evaluation

In 2008 we created an evaluation form based on the heuristics used by Desurvire, Caplan, & Toth (2004) and distributed it with copies of Pest PI to four sophomore biology classes. Students were asked about age appropriateness and game play, story, mechanics, and usability (Table 2). Completed forms were collected the following week.

**Table 2.**  
Evaluation Form Participant Results (n=33)

<b>Evaluation Point</b>	<b>Percentage</b>
Felt game play was appropriate for the intended audience.	88
Felt key concepts were effectively conveyed during game play.	100

Felt the game was reasonably complex.	88
Felt that skills required later in game play were learned early.	91
Expressed that the game seemed easy to use and had clear and straightforward navigation.	84
Said that they received immediate feedback for their actions.	88
Said that the menus were well organized and minimalist—in other words, the menu items were intuitive.	97

## Conclusion

Survey and evaluation results show that Pest PI had a positive effect on teaching children about IPM and that it was appropriate for the 4th-6th-grade age group in presenting concepts and facilitating learning. Statistics also indicate that children would tell others about IPM, thus increasing awareness about IPM and its benefits among their peers, teachers, and parents, and encouraging its use for future generations.

For more information about Pest PI or to order a copy, contact Erin Bauer <[ebauer2@unl.edu](mailto:ebauer2@unl.edu)> at UNL Extension.

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