UW-Madison: Researchers create online game that lets players reimagine land use based on real science

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UW–Madison researchers teamed with New England conservation nonprofit Mass Audubon to create an online learning game that lets players model how different zoning choices would affect the environment, jobs, housing and other real-world factors for any location in the contiguous U.S.

Built using a variety of state and federal data sets, the free game, known as iPlan, lets players simulate different land-use scenarios and see the changing effects on their community, for good or bad or in between.

To get started, iPlan players use Google Maps to model a selected region, divided into around 200 parcels labeled by their current land use. Then it's time to imagine different activities and see how those affect a series of local indicators — sending pollution, for example, up or down.

"One of the key things that people learn when they use iPlan is that there are trade-offs across different outcomes," lead game developer Andrew Ruis says. "For example, you can lower greenhouse gas emissions to fight climate change, but without innovation, most of the ways to do that also reduce housing or jobs or commercial activity."

Ruis is associate director for research at Epistemic Analytics, a lab within the School of Education's Wisconsin Center for Education Research focused on creating novel approaches and computational tools to improve the teaching and assessment of

complex thinking.

"Every land-use decision has impacts," Ruis explains. "The extent to which you prioritize different impacts is a social question. It's about what people value and what they care about. The simulation is designed to model that."

Funded by a four-year, $2 million grant from the National Science Foundation received by David Williamson Shaffer, the Vilas Distinguished Achievement Professor of Learning Sciences in the Department of Educational Psychology and director of the Epistemic Analytics Lab, iPlan is designed to advance informal learning in science, technology, engineering and math (STEM) topics for teenagers.

"Simulations like iPlan," Shaffer explains, "make it possible for kids to explore and solve real-world problems, both in and out of school. It's a powerful way to get kids interested in STEM and the role STEM professionals play in society."

Early tests suggest it's doing just that, especially for students who otherwise can be hard to reach, says Julia O'Hara, a teacher-naturalist with Mass Audubon, the largest nature-based conservation organization in New England.

Headquartered in Lincoln, Massachusetts, the organization offers nationally recognized environmental programs for adults and children in schools, parks, natural areas and other sites across the country.

"We've noticed that learners who don't do as well with tests and books tend to do really well with iPlan, which is really great," says O'Hara, who's been using her connections with educators to get the game into classrooms in several states and train instructors to use it. "Teachers seem to love it, and they do mention that they would want to use it again."

But iPlan is not just for educational contexts, Ruis notes. The game also could be used for outreach and information-gathering by governments or nonprofits, or by anyone who has moved through a town and wondered what its land-use map look like.

"For literally anywhere in the contiguous U.S., you can get a model and have it be accurate enough for educational purposes and for outreach purposes," Ruis says. "This was designed to introduce lay people to land-use planning concepts and practices, to help them understand the relationships and trade-offs between land

use and various indicators, and to be able to do so in their local environment. And it's fun to use."