

Online game trains players how to sort waste correctly

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A simple online game can teach people to more accurately sort waste—with lasting results, a new UBC study has found.

Study participants who played the game developed by UBC researchers received immediate feedback on their sorting choices. The second time they played—when feedback was no longer provided—players still improved their average accuracy from 69 per cent to 84 per cent. Even when a week passed between games, players still improved their accuracy.

As part of the study, researchers also exposed students living in university residences to the game, then monitored their waste bins. They observed both a slight reduction in contamination—defined as the presence of items that shouldn't be in a particular bin—and an increase in compost weight.

"This immediate feedback increases recycling and composting accuracy over the longer term, both in the lab and in the field," said Jiaying Zhao, assistant professor in UBC's department of psychology and senior author of the study. "One of the big questions in psychology is how long do these effects last? Our biggest takeaways are the fact that immediate feedback works, and the effects last over time.

As solid waste increases rapidly, accurate sorting is becoming imperative in North American cities where the average person throws out 700-800 kilograms of solid waste each year. In the U.S., solid waste generation per capita increased 64 per cent between 1960 and 2013. One-third of landfill waste is organic and releases methane into atmosphere. Methane is 25 times more potent than carbon dioxide in creating conditions for climate change.

Yu Luo, the lead author of the paper, noted that social norms and the convenience of waste-sorting bins have encouraged people to try dealing with waste properly, but even when they make the effort, they make mistakes.

To correct these mistakes, Yu developed a [simple sorting game](#). Four squares representing waste categories appear across the top of the screen: food scraps, recyclable containers, paper, and garbage. Then a picture of a waste item appears below. Players must decide where it goes. They are told whether they were right or wrong. If they were wrong, they are told which bin was the correct choice.

Research in cognitive psychology has shown that immediate feedback helps people learn and improves their task performance. The results of the experiment bear that out.

For the field experiment, researchers spent two weeks gathering baseline data on the weight and contamination rates of bins in three UBC student residences. Then, for six weeks, they promoted their game among residents of two buildings. Afterward, they spent three weeks gathering waste data and found that sorting had improved slightly in comparison with the third building.

Zhao is encouraged by results that suggest virtual sorting can help solve a real-world problem. UBC Campus and Community Planning has already adapted her group's research for a version of the [game](#) that is now part of orientation for first-year students, complete with leaderboards and prizes. Zhao sees no reason the idea couldn't be applied in all residential buildings—on campus and off.

The "gamification" of waste sorting could go a long way toward reducing contamination in waste streams and reducing the volume of solid [waste](#).

The study was published last week in the *Journal of Environmental Management*.

More information: Yu Luo et al. Providing immediate feedback improves recycling and composting accuracy, *Journal of Environmental*

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