

# Some assembly required to boost robot ratings

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Robot makers may want to follow Ikea's strategy for customer satisfaction and give people a chance to partially assemble their new robots to ease acceptance of the devices, according to Penn State researchers.

Just like the way fans of the Swedish furniture manufacturer derive a sense of fulfillment when they help assemble their own furnishings, people who took part in a study on robot assembly tended to feel more positive about the machines if they had a hand in making them, said S. Shyam Sundar, Distinguished Professor of Communications and co-director of the Media Effects Research Laboratory. However, the researchers cautioned that customers who experience a little too much aggravation during assembly will evaluate the robot more negatively.

"There is this so-called Ikea effect, with consumer behavior research supporting the notion that when people assemble the products themselves, they feel a great sense of accomplishment and they see themselves reflected in the products they helped to build," said Sundar. "We guessed that if you find that effect in objects like furniture, you would find that effect in interactive media and especially robots."

The participants who helped assemble their own robots were not only more likely to have higher sense of accomplishment, but also a higher sense of ownership.

But, those who experienced too much difficulty assembling or

programming their robots—perceived process costs—lowered their ratings of the robot, as well as the interaction with the device.

"The manufacturer should give the customer a sense of ownership and a sense of accomplishment, but without making the process feel too painful because if the perceived process costs are too great, robot evaluation is going to suffer," said Sundar, who worked with Yuan Sun, a graduate student in communications.

Manufacturers may want to target positive factors while minimizing the negative effects of self-assembly when they design and market their robots, especially in a market that is generally wary of using robots, said Sundar. He also suggested that ongoing customization of robots might reinforce the owners' initial positive feelings.

"One design implication in our findings is that robots should be customizable by individual users and the customization should go beyond the assembly stage," Sundar said. "While self-assembly can provide an initial sense of accomplishment, the sense of ownership can be sustained with tailoring options that users can continue to tinker with, long after the initial set up."

The researchers, who present their findings at the Human-Robot Interaction conference today (March 8), said that participants tended to have a higher sense of accomplishment and rank robots higher when they expected robots to be task-oriented, rather than interaction-oriented.

"A task-oriented robot would be used for simple services, such as greeting visitors at museums or restaurants, while an interaction-oriented robot is more than likely used for entertainment processes, such as playing music or videos," said Sundar.

The researchers recruited 80 undergraduate students for the study. The participants were then randomly assigned to test the study's four conditions. Half of the participants were told to expect a task-oriented robot, while the other half was assigned to the interaction-oriented condition. In the self-assembly condition, participants were required to make several hardware and software modifications to a tabletop robot, including adding a battery and setting up the programming software. In the control condition, a researcher demonstrated the set-up process for the robot. After the set up, all participants interacted with the robot for 5- to 10-minutes as they got the [robot](#) to utter greetings and perform a dance.

In the future, researchers may want to collect and examine the types of responses participants have during the assembly process.

Provided by Pennsylvania State University

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