Using robots to help children with autism

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(Medical Xpress)—Her name is Charlie, and the purple bows sitting on top of her head are the prettiest thing about her. But her looks are not what matter – which is good because she's green. Charlie is a robot designed by University of South Carolina's College of Engineering and Computing doctoral student, Laura Boccanfuso. She hopes Charlie, short for Child Centered Adaptive Robot for Learning Environments, will help children with autism improve their communication skills and interactions with others.

"As I was researching ideas for my doctoral work, I came across similar robots being used to help children with special needs," Boccanfuso said. "As a mother, I understand how important it is for parents to have access to affordable tools to improve their child's future."

In 2010, with help of assistant professor Jason O'Kane, who built the no-frills robot, Boccanfuso designed Charlie's exterior and implemented all of her games and functions. Boccanfuso placed a camera in Charlie's nose and designed software that allows the robot to detect and imitate the motions she records.

"If the child puts up his right arm, Charlie will lift her right arm, too," she said. "The robot feeds off of cues from the child and can change the way she plays or interacts based on the child's movements and behavioral responses."

Boccanfuso recently began using an infrared sensor in conjunction with Charlie, which allows her to detect temperature and breathing changes in a child. This part of the research was funded by a grant from the South Carolina Developmental Disabilities Council.

"Charlie knows she needs to sit passively if the sensor picks up that the child is getting agitated. That is important for child with autism. You must communicate with them in a non-alarming way."

Boccanfuso said previous research shows that verbal utterances from children went up when they were interacting with robots, even simple ones.

"My hope is that Charlie could be widely used and accessible to all families. She is not expensive to build, so maybe parents will be empowered to use robots to help their kids improve communication skills at home."

Now, Boccanfuso is working with Ruth Abramson and Harry Wright at the USC School of Medicine to test Charlie with a group of children with autism. In the next three to six months, she hopes to watch these

children interact with the robot and record their verbal and physical interactions.

"Then we will know if our hypothesis is true," she said. "If this robot can, in fact, improve the life for children with special needs, that would be a dream come true."

Provided by University of South Carolina