RESEARCH LEADERS

UNIVERSITY of GUELPH

BARBARA MORRONGIELLO

Canada Research Chair in
Child and Youth Injury Prevention

TOWARD SAFER STREETS

Virtual reality system helps prevent injuries to children

New technology makes crossing the road safer

Guelph's virtual reality lab can project potentially dangerous situations for pedestrians – especially children.

Virtual reality isn't limited to high-tech video games – it can also be used to study complex human behaviours and decisions. For example, this technology can simulate a potentially dangerous situation – but do so in a safe environment. This is a useful tool for studying how children behave in dangerous situations.

Prof. Barbara Morrongiello, Canada Research Chair in Child and Youth Injury Prevention, is using a custom-built virtual reality system to analyze children's behaviour when crossing the street. She's concerned because motor vehicle-related pedestrian injury is a leading cause of death and hospitalization for children ages five to nine years old in Canada – and she wants to understand why.

"I'm very motivated to improve the health and well-being of children and families, and reduce the frequency of childhood injuries," says Morrongiello. "I see this project as a way for me to achieve these goals."

"The training system can be implemented virtually anywhere because it's easy to use, portable and inexpensive."

Guelph's virtual reality lab is the only one of its kind in the world. In collaboration with Mike Corbett, a PhD student in Psychology, it was built by talented computer science students from the University of Waterloo and the University of Guelph, taking three years to complete.

But Morrongiello says it was well worth the wait. The lab can simulate any type of traffic situation, from busy intersections to quiet neighbourhood streets. And it is a completely immersive experience that presents realistic visual and auditory components.

Here's how it works. In the simulation, children wear a headset with goggles that display a street-like environment. As they walk around the lab, their perspective in the virtual traffic environment changes when they move and turn their heads – just as if they were actually walking across a road. They start by standing at the virtual curb and scanning the traffic conditions, looking to decide whether to cross and then proceeding when they deem it is safe. The system evaluates their walking speed and path relative to the traffic, and determines how close the child came to being hit by the cars.

It's a complex process to study. Morrongiello has to consider not only factors related to traffic situations in her research but also a child's temperament and characteristics of the environment such as lighting conditions.

Morrongiello has found that children's cognitive skills, including attention and working memory, affect their crossing abilities. Working memory is the ability to hold several pieces of information in your mind for a short period of time and to use the information to complete a task – such as using the car's speed and distance to make a decision about crossing the street. The fact that cognitive skills influence crossing behaviour is an important finding. If these cognitive skills can be improved by training, then child pedestrian injuries could be reduced.

Few effective programs exist to help children learn to cross the street safely. In the next few months, Morrongiello and Corbett will take a portable training system – similar to the virtual reality system – to some schools to test whether the training improves children's abilities. If the training is successful, it could be offered in schools as part of children's safety training.

"Hopefully it will reduce the incidents of 'hits' and 'close calls,' and we'll improve children's street-crossing abilities," says Morrongiello. "The training system can be implemented virtually anywhere because it's easy to use, portable and inexpensive."

This research is funded by the Canada Research Chairs program, the Canada Foundation for Innovation and the Canadian Institutes of Health Research. For more information about Morrongiello's research, visit the Child Development Research Unit website at **http://cdru.psychology.uoguelph.ca**.

Morrongiello can be reached at bmorrong@uoguelph.ca or 519-824-4120, Ext. 53086.

UNIVERSITY of GUELPH

Office of the Vice-President (Research)
University of Guelph
Guelph, ON Canada N1G 2W1
519-824-4120, Ext. 53081

This profile was written by Karen Ball, Students Promoting Awareness of Research Knowledge (SPARK)

The Canada Research Chairs program aims to boost the country's capacity as a global research leader by supporting outstanding and emerging scholars and scientists. The program, administered by the federal government, invests approximately $265 million per year in universities across Canada to attract and retain some of the world's most accomplished and promising minds. Chairholders aim to achieve research excellence in engineering and the natural sciences, health sciences, humanities and social sciences. The program has established almost 30 research chairs at the University of Guelph.

Visit the Canada Research Chairs program website at www.chairs-chaires.gc.ca and see Guelph's Canada Research Chairs at www.uoguelph.ca/research/discover-our-research/research-chairs/crc.