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Mines Team Develops Virtual Reality Hazard Awareness Training Program



Clint Kling, a doctoral graduate student in the Department of Mining Engineering and Management at South Dakota Mines, is shown here testing a virtual reality training system he helped develop to improve safety in industrial settings.

Underground and surface mines can be hazardous places, so when it comes to safety training in the mining profession, the old saying “practice makes perfect” holds true. To improve hazard safety instruction, a team at [South Dakota Mines](#) has spent the past year developing a virtual reality (VR) training module that mimics a mining environment.

“We are using new technologies combined with neuroscience to help people learn faster and more effectively,” says Clint Kling, a mining engineering doctoral graduate student who is currently working on the project under the guidance of Associate Professor Purushotham Tukkaraja, Ph.D., in collaboration with the company Motive.io. The research is funded by the United States Department of Labor, Mine Safety and Health Administration (MSHA) with a grant of \$100,000.

The VR hazard awareness training is designed for new and inexperienced miners and will be available in English or Spanish. It will be conducted alongside the already existing MSHA training program at South Dakota Mines, the local mine sites, and will also be used in MSHA’s refresher training courses. The team plans to develop this program at the local level to establish good results before a national rollout. The

researchers are also taking their ideas to the marketplace. They are ready to collaborate with any industry partners such as mining, construction, or general industry to develop a new VR safety training program that will prove effective and valuable according to their needs. "There is much thought in the background detail that goes into every move and interaction in the environment to give the end-user the most effective and beneficial training. A successful VR training module is in the creation of its storyboard," says Kling. "We are pleased that MSHA gave us the opportunity to develop our idea to help make the mining world a better and safer place to work," Dr. Tukkaraja adds.

"We want people to go home safely to their families at the end of the workday. We hope to create a safe mindset that will carry with them wherever they go. The first step in controlling workplace hazards is to identify and determine which hazards are present." Kling says. "Our brain is always learning even when it's negative and including the things you don't do. So, your behavior in your everyday life is important; each one of them is changing your brain. We need to break the habits and behaviors that are not healthy."

Traditionally, mining workplace safety has been a complex subject to effectively convey in a classroom or even on the job because of all the dangers involved. "Having trained in VR ensures the person's safety but also shows them the potential hazards of a mining environment. We see the benefits of VR for safety training and the future of it as well. Our goal is to develop a lasting training program using VR because of its proven effectiveness," says Dr. Tukkaraja.

The team seeks to improve the outcome of safety training by creating a more safety conscientious worker who is better prepared to work safely in their environment. "There is a considerable amount of time spent in classrooms teaching people how to be safe, but there is still room for improvement. We want to help close the gap and make more use of our time in the classroom to help people become more safety-oriented and work towards our goal of zero accidents," says Dr. Tukkaraja.