

Institut national
des mines

Québec 

Training Mining Operators with Simulators

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The Institut national des mines (INMQ) is very interested in new virtual approaches to teaching (*e-learning*). A recent research report concludes that this method promotes better use of simulation technology to make training in trades that lead to a career in the mining sector more attractive to young people.

The work of mining machinery operators is essential to the viability of mines, which are largely dependent on skilled operators for daily movement of large amounts of materials. In addition, mine operating methods are quickly evolving due to technological advances. The growing trend is toward highly mechanized underground and open pit mines. Mining machinery is increasing in size as well as complexity, and is often remotely operated to improve worker safety.

Many types of mining simulators have reached a level of development that greatly facilitates learning on a wide range of machinery specific to open pit and underground mines. These new high-performance simulation tools are also well adapted to optimizing the operation of this mining machinery through continuous training on the job.

The latest generation of mining simulators actually reproduce the performance of a wide range of equipment and brands with impressive realism, not only in normal operating conditions but also in extreme

conditions that could not be simulated on actual equipment. The simulation of extreme conditions (heavy rain, snowstorms, freezing rain and ice sheets, punctured tires, engine fires, etc.) prepares students to cope more effectively with a large number of unexpected situations. Simulation training also facilitates the acquisition of 360 vision and the learning of safe movements from actual mining sites, preselected and reproduced in great detail.

The international mining simulator market is posting strong growth and is the domain of a handful of designers who also offer clients customized continuous training programs.

Some mining companies in Quebec have adopted this technology to boost productivity and reduce machinery maintenance costs. However, no vocational training centre in Quebec offering mining training currently has a high-performance simulator. The Harricana school board's vocational training centre is using a simulation approach, however, for some instruction of heavy machinery operators in the field of forestry transportation. The CEGEP de Sept-Îles also has several high-performance simulators for railway operators, especially for moving iron ore.

Access to simulator training would open new opportunities for educational institutions in Quebec to innovate in the vocational and technical training they deliver to the mining



sector. The Institut national des mines has found that use of simulators would especially facilitate updates of existing programs and minimize mining equipment purchases and maintenance.

However, since this constitutes a major innovation, the introduction of simulators to train mining machinery operators in vocational training centres in Quebec would

require an assimilation period to respond to anticipated questions from instructors and authorities on methods for using this technology, the implementation framework and new skills that would be developed.

Specifically, this period would allow for assessment of the technical performance of simulators in a public education context, as well as measurement of this technology's

impact on standardized diploma programs currently in place. This assimilation period would document learning and success rates for the first cohorts of students trained on simulators. There would also be an opportunity to define teaching practices and new skills that instructors must develop in order to script teaching activities that use simulation to achieve the goals of educational programs specific to the mining sector.

In conclusion, the Institut national des mines is calling for the adaptation of simulation learning technologies to Quebec's public education context in order to attract young people to the mining sector and consolidate the relationships maintained by vocational

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training centres with mining companies that provide internships and, ultimately, jobs for graduates of public institutions.

Ref. Rapport d'enquête de l'Institut national des mines sur l'enseignement par simulateur, Val-d'Or, May 2014, available at www.inmq.gouv.qc.ca.

The Institut national des mines du Québec has a mission to support the government in carrying out its responsibility for education in the mining sector. A key task is to maximize workforce training capacity by optimizing the means available and using them in a concerted vision shared by all players in the mining sector.

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