



Manitoba Heavy Construction Association (MHCA) Final Report

November 30, 2017-March 30, 2018

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1. MHCA acknowledges that the project is funded by WCB as per the statement provided.

"Supported by a grant from the Research and Workplace Innovation Program of the Workers Compensation Board of Manitoba"

2. Executive Summary

In this project, Manitoba Heavy Construction Association (MHCA) undertook or implemented to change and improve occupational health and safety practices/behaviors of construction workplaces. The innovation developed in this project included the application of existing knowledge in new innovative ways using technology to address safety concerns identified by construction industries.

This initiative sought to implement change and improve safety training through the use digital media resources/gaming. Existing knowledge was presented using a new communication style that is very attractive to our youth. We sought to prove that digital media resources are also attractive to adults who have kinesthetic learning styles. The best part is they could revisit the virtual resource/games as often as they want. Repetition is the key to long term memory retention for adults.

MHCA was seeking to demonstrate that this new technology allows participants to explore and learn about safety in the workplace through a self-guided interactive learning experience. Students received feedback immediately on their responses to questions in each game/activity. The safety courses are installed into any device and used in the most remote regions. This showed us that digital media allows for greater accessibility to training in remote regions and at a time it is needed. This is a practical, shop-floor solution that improves workplace health and safety practices/behaviour and addresses occupational health and safety in the workplace.

MHCA digital media tools:

- Improve the culture of workplace safety with accessible and flexible programming
- Increase the modes of program instruction through distance delivery
- Provide consistent standards of best practice in delivery of the courses



- Give immediate feedback and results
- Increase retention because training can be repeated
- Give up to date content at a lower cost
- Are a better fit for today's virtual companies

3. **Project Overview/Introduction:**

The Manitoba Heavy Construction Association digitalized four safety courses for use in both blended and on-line delivery of training in support of the WORKSAFELY MHCA program. The target group or audience included general labourers, trades people, new supervisors and safety trainers working in construction and transportation. It was the intention of MHCA to share these resources with the Construction Safety Association of Manitoba (CSAM), Manitoba Trucking Association (MTA) and other safety associations who would benefit from these interactive resources. The courses developed included Flag Person Training, Personal Protective Equipment (PPE), Prime Contractors and Road Builders Safety.

Rationale: The blended/on line format will standardize safety training, allows greater access to training in rural and remote locations, increased access for refresher training, improved retention through use of different teaching strategies and repetition and reduces employee time away from work. Recent changes to legislation demand increased training in these areas so digitalization of the courses ensure larger audience receive certification. Digitalizing the courses further enable workers in the construction industry to pursue their Construction Safety Officer designation and gain credits towards their gold seal certification. Both designations are a declaration of skill and competence that is recognized by the construction industry across Manitoba. The Construction Safety Officer designation and the Gold Seal Certification enhances the professional development of the construction industry.

Review of Work Completed

Over the past two years the content for the MHCA project was revised on three of the four safety courses and technology supplements were developed for the same four courses. These included flag person, road builder's safety, personal protective equipment and prime contractor.

The courses were developed as per the timeline and deliverables set for the project. Advisory members from MHCA, RPM Trucking Industry Safety, Construction Safety Association of Manitoba and Safe Work MB. came together to confirm the courses that were a priority for the construction industry. The committee members recognized not all of the courses were relevant to all of the member's needs but some could be adapted to suit their specific requirements. Each advisory member assigned a working group member to develop the technology and revise course content where necessary.



The working group met to determine content for the flag person training. The content would not be revised as it is set by Manitoba Workplace Safety and Health. The team decided to produce a flagger game that would allow learners to choose the right clothing, place them in the right spot on the construction site and use the proper hand signals. The working group was engaged right away in the development of the game. They quickly recognized the value of technology in making safety training more exciting. When the game was developed, it was piloted with the advisory committee. It took a long time to develop the learning objects in the game and some advisory members thought it was a short activity for all the work involved. The learning outcomes were excellent and the value of a safety game for flagging was confirmed. This was the beginning of the learning journey. The flag person game was used to teach safety at both CSAM and Work Safely.

The second course was road builder's safety. This 16-module course was outdated and was only available electronically. The project manager had a team type out the entire course and recreate all the images from the on-line course. This was an extensive process. Following that step, the working group reviewed the content, eliminating irrelevant and inaccurate information and then rebuilt the content from the ground up with current legislation and content. Learning outcomes had to be developed and the assessments had to be re-written to match the outcomes. New pictures were taken by MHCA in Winnipeg of current construction projects to include in the manual.

With the content complete, the advisory decided to use 360-degree imagery for each module. They wanted more bang for their buck in the second course. Panoramic images were taken at construction sites in Lake St. Martin with Hugh Munro Construction, at a Maple Leaf Construction plant, a Maple Leaf construction site on Isbister and in Elie Manitoba, and a Bird construction site on Pembina.

All content in the 16 modules was inserted in the 360-degree images. Each module contained 4-5 pano shots. It was designed so the learner has to go through all content in each pano before they can proceed to the next. Once all content was added into the pano shots, audio was produced for the course. The audio was recorded by someone outside of the industry so it was full of pronunciation errors. It was decided MHCA would rerecord the audio. This course took the longest of all the courses but it was validated by the industry. The advisory was pleased with the amount of effort and the final result of this activity. Both courses were piloted and revised based on the feedback from industry members.

By this time, the working group was developing a better understanding of adult learning principles and the use of technology for specific purposes. The third course to be revised was personal protective equipment. The course content needed upgrading. The project team rewrote the content and replaced the outdated pictures. The working group took pictures of PPE that was worn and PPE that met specific working conditions. It was a team effort. This time the advisory and working group decided to use QR codes. This was a new technology that had not been used. The team was excited with the variety of



technology they could use to teach safety. The use of QR codes would give students instant access to 'just in time' information about PPE as they need it.

This is when the digital team recognized this resource could be disseminated as a free application on the apple store. In this way, updates could be easily disseminated and access would be simple. All technology from this point forward was accessible on the app store except for RSTS that was too large and content for safety courses that belonged to the safety associations. However, MHCA took it one step further. They decided that all course content from this project would be shared with high schools who had limited access to safety training. Colleges would have access to the course supplements but if they wanted course content, they would need to contact MHCA. This was because a fee for service is received for college students and MHCA felt they too should be compensated for contributing to the curriculum.

The final course developed was prime contractor. The manual was text heavy and was not engaging. The team decided to make use of a learning management system. They researched different options and decided to use Word Press. The content was rewritten by MHCA and learning objects were created to engage learners. Video segments were created using industry experts for each section. The safety representatives wanted the voice of industry in the course to give it validity so the experts were interviewed to give their perspective on each aspect of the course. Experts came from EF Moon, PCL, Brandt Tractor, Hugh Munro Construction, Nelson River Construction, CSAM and Arneson's. It was invaluable to have so many industry representatives engaged in the development of these resources. When industry is part of the development they will be more likely to buy into supporting the training.

MHCA has learned how to use the Word Press LMS and has since decided to embed all MHCA safety courses in it. This LMS is compatible with many other programs and can be transferred to different platforms without duplicating the data input process. Dissemination of the resources happened throughout the process at safety committee meetings, conferences, career fairs, and school presentations.

KTP Project Pilots during the Project

2016 Dissemination Events: Flag Person Training and Road Builders Safety Training Systems

September 8th MCSC Education and Training Committee Meeting

September 13th Construction Association of Rural MB

October 3rd Manitoba Building Trades



October 4th Assiniboine Community College

October 6th Manitoba Homebuilders Education and Training Committee Meeting

October 18th Skills MB Presentation

October 24th meeting with Ministers and Deputy Ministers from Education and Training, Growth, Enterprise and Trades and Infrastructure

October 27th Alliance of Manitoba Sector Council presentation

November 1st Red River College, College Working Group Meeting

November 3rd Skills Canada-Manitoba

November 3rd Manitoba Homebuilders Education and Training Committee Meeting

November 17th MCSC Education and Training Committee Meeting

November 18th: Howard May visit

November 22nd: Red River College, Strategic Council event

November 24-25th Disrupted, RBC Convention Centre

2017 Dissemination Events

January-April 2017 During this reporting period, Brent Good from Hugh Munro Construction piloted the RSTS course as part of the Introduction to Heavy Construction course in Shoal Lake First Nations, Freedom 40 road building project. The participants were new entrants to the heavy construction industry who will be working in the road building project in the spring of 2017. Brent Good said, “The new RSTS course provided participants with current information that is based on legislation from the province of Manitoba and not safety legislation of other provinces, that was the case in the past. As the instructor, I was able to select modules that were relevant to the road building project and delete modules that did not pertain to Shoal Lake. There were 5 modules required and an additional 11 optional modules from which I was to select two modules. The technology gave students a front-line view of what safety looks like on a road building project without putting them in harms way.” This is the second pilot of RSTS in a First Nations community.

The project manager hosted an open house at 1000 Waverley to demonstrate the new technology and safety training on **January 12, 2017**. Matt Lothian from CSAM, Phil McDaniel from MHCA and Dan Blair BIT were the hosts. There was an incredible response despite the extreme weather conditions. Participants dropped in to see a sneak peak of Flag person training and RSTS.



Moe Levy, Executive Director of the Asper Foundation called the project manager to request a demonstration of the technology developed in this project. Moe Levy met with the project manager and Dan Blair on **January 30, 2017** to learn more about how MHCA is using technology to improve safety training. Moe was impressed with the technology and said he is looking at ways to use this technology through his work at the Asper Foundation. There has been not further correspondence since that initial meeting.

On **February 7-8th 2017**, MCSC held a booth at the Construction Safety Association of Manitoba (CSAM) Conference to demonstrate the RSTS technology. BIT Space Development and MCSC were there to demonstrate the use of VR to teach safety. At all events, tent cards with the WCB RWIP contribution statement are proudly displayed.

In addition, the course was presented to the WORKSAFELY COR Advisory Committee on **March 6, 2017**. Members were invited to pilot RSTS within their companies.

MHCA hosted the annual WORKSAFELY EXPO at the Victoria Inn on **April 4-5 2017**. MCSC set up a booth to demonstrate RSTS to members and guests of WORKSAFELY. The technology was very well received. Companies informal feedback was 'this technology is the way of the future for safety training'. They knew 'other courses that would be well suited to this approach'. This dissemination was a booth where individuals spent a few minutes trying out the technology. No formal evaluations or feedback was provided by participants at the event.

May-August 2017: RSTS and the Flag Person Game became part of the Introduction to Heavy Construction course offered in first Nations communities. May 2017, Fairford First Nations Pilot of Flag person and RSTS by Eline Anderson, retired Indigenous Heavy Equipment Operator and MCSC Indigenous instructor.

June 1-2 2017: Skills Canada Competition: Flag Person game was piloted with 10,000 youth from across the province.

June 8, 2017: the new resources were shared with the MCSC Education and Training Committee who represent industry, government and community partners. In addition to the meetings, a quarterly newsletter is sent out by MCSC that features the new technology. Those who receive the newsletter were invited to contact us for more information.

June 29, 2017: The new resources were shared with the sector councils from across Canada. In Halifax. 10 were in attendance. The members were impressed by the technology used to teach safety. There were no specific comments made as this was an event to share best practices across Canada.



September 21st 2017 Technology Event: The technology event provided the 46 attendees an opportunity to try out the resources and learn more about how subject matter experts from safety associations, work together to build interactive supplements to support learning. Matt Lothian and Ross Jardine from CSAM attended as did Phil McDaniel from MHCA, and Brent Good from HMCL. The subject matter experts guided the attendees through each activity.

September 27th MCSC College Working Group: The College working group comes together quarterly to share best practice and new developments. MCSC reports on the progress in the WCB RWIP project so the colleges could access the resources for use in their construction and safety training programs. The college working group will support the dissemination of all safety resources. Kim Poirier, Manitoba Education and Training, will be joining the working group in the new year. This is an important link to the school divisions.

October 30th 2017 Ministers Schuler and Minister Wishart meeting: The project manager met with Ministers Schuler and Wishart to inform them about the sector council activities that include the partnerships that have been made with WCB RWIP, IBEW, MHCA and MHBA.

November 3rd 2017 Career and Workforce Development Month Kick off: The project manager was asked to speak to the importance of partnerships. she spoke about the development of innovative education and training programs being key to engage new entrants and returning workers to construction. She acknowledged partnerships with the WCB RWIP program, IBEW, MHCA and MHBA, BIT for the expertise in digital technology and the many industry representatives who participate on the working groups. As a result, the project manager had a meeting with Swan River School Division November 20th to discuss how they can access resources for students attending vocational programs in the area.

2018 Dissemination Events:

January 18-19th 2018 The project manager went on a tour of the north visiting University College of the North in Thompson and the Pas and meeting with the President of UCN, Doug Luvstead, the VP of Academics, Dan Smith and the VP of the Trades and Technology Centre, Rob Penner. UCN will be provided with VR and I-pad technology from MCSC to support the dissemination of resources in the north.

Jan 22-26th 2018 BIT Space Development was invited to attend the career fair in the Pas and Cranberry Portage. This provided an opportunity to pilot the resources with a variety of audiences. (See Appendix 2 for feedback from participants)



- Day 1: Meet with UCN to discuss technology and potential partnerships in the north. Afternoon filled with technology pilots with UCN trades students from heavy machinery, auto mechanics, and mill writes. (80 students)
- Day 2: Morning meetings with Margaret Barbour Collegiate Institute. These talks included technology pilots as well as discussions about trades and technology. (90 students). Afternoon demos with Mary Duncan Alternate School (20 students)
- Day 3: Frontier Collegiate Institute (Cranberry). Open demonstrations with students coming and going, open Q&A and pilots. (approx 30 students)
- Day 4: Hapon Collegiate (Flin Flon) for afternoon. 5 sessions with students including Q&A as well as technology pilots. (80 students) Evening demos back at Frontier Collegiate, (40 students)
- Day 5: Morning meetings with instructors and school staff regarding technology and how to implement these apps in their classes and how to access the technology. Afternoon demos with MBCI again, this time an open session with kids coming and going, 20 students used the VR.

The week was very busy with demos and meetings, BIT considered this opportunity a success, as they reached a lot of students, teachers and administrators.

Total: 350 students

January 25th 2018 Honorable Ian Wishart, Minister of Education and Training and Lynette Plett, Senior Executive Director, Industry, Training and Employment Services, Government of Manitoba stopped by BIT Space Development to try out the new technology. Lynette said out of all the technology tried that day, the construction resources developed for WCB RWIP, were the most engaging. A follow up meeting is planned.

February 1-2, 2018: **Disrupted Conference: *Work is evolving and technology is the driving force....*** the resources were on display at a booth at the conference to over 450 participants. The project manager presented to the audience of 450 about the value of technology to engage underrepresented groups in learning safety.

February 8th 2018 Jamie Grant, Executive Director of the Northern Manitoba Sector Council and Louis Ghiz, Executive Director of New Media Manitoba met to discuss plans for dissemination and support for facilitators who use technology to support learning.

March 6, 2018 **MHCA Industry Expert Dissemination Event**

Feedback from the event was positive. All attendees commented this is the way of the future. This is the way young people learn. They said often safety legislation can get very dry so this brings learning alive in the classroom. Jeff Love, Safety Trainer for Borland Construction said that it was ideal that there were many ways to access our learning.



March 7, 2018 Lessons Learned Meeting with MHCA

March 7, 2018 Lessons Learned Meeting with MHCA

What did we learn as we went through this project?

- We found new innovative techniques to enhance our four existing courses.
- We found we could use technology to create blended learning such as the flagperson game.
- Introduced us to new technological modes for learning such as virtual reality, panoramic pictures, and QR codes.
- Introduction to the LMS- an item by itself

Supplement #1: Flag person game: It's a tool to add to our training catalogue, a pre-activity before you take the program, what you will be learning in the course or a review at the end. It can be used for young people training in high schools as an industry awareness, or for those who have never been on a construction site. The flagger portion costs a lot of money as it was labour intensive. Was it worth the money? For the amount of money, you don't get what you expect when it comes to games. MHCA will be able to hook up the apple tv to get it going at the WCA career expo.

Supplement #2: QR Codes for PPE: This is a different way to give our industry take aways. QR codes have been around awhile but using it in this application is new. Whether its legislation used in class or for tool box talks, its getting our students aware of apps. It causes us to think how can we use QR codes in different ways? You walk away with something that does not get thrown out. Its like a tip card that is on your own phone.

Supplement #3: Road Builders Safety Training System (RSTS) Use of 360-degree imagery It's a multi-platform interface. This allows us to have fewer limitations when delivering this course. You have the option to get the training through virtual reality with headsets, or simply using your computer. You also have the option to take it in a classroom. The 360-degree imagery allows the student to be immersed in a construction site virtually. There was a lot of time spent on this course. Updated narration and 3 of 4 courses were rewritten.

Supplement #4: Learning Management System (LMS) for the prime contractor took a very legislation heavy course and made it engaging on an LMS. It gave us an opportunity to learn about the potential for LMS for all our courses. It has the potential to be the registration system.

These technological resources allow us to use different tools to enhance our training and engage our learners. We feel that these tools are also multigenerational. As we use this technology we are cognizant that we may need to adjust our materials.

MHCA needs access to technology to use these new resources.



Curriculum and Other Resources

PPE iOS:

- <https://itunes.apple.com/us/app/rpm-safety-ppe-course-companion/id1277126828?mt=8>
- <https://itunes.apple.com/us/app/mhca-ppe-course-companion/id1265905122?mt=8>
- <https://itunes.apple.com/us/app/csam-ppe-course-companion/id1277127305?mt=8>

PPE Android:

- <https://play.google.com/store/apps/details?id=com.bitspacedevelopment.csamppe2>
- <https://play.google.com/store/apps/details?id=com.bitspacedevelopment.mhcappe>
- <https://play.google.com/store/apps/details?id=com.bitspacedevelopment.rmppe>

Flagger:

- <https://itunes.apple.com/us/app/mhca-flagger-safety/id1161840817?mt=8>

Prime Contractor / LMS

- <http://worksafely.bitspacedevelopment.com/>

RSTS (Download Link)

- <https://drive.google.com/file/d/1hkWR6O8yRSkNZ-6CPJITAWhPEyocXrk-/view?usp=sharing>

An Executive Summary Final Report

The two-year Manitoba Heavy Construction Association project brought together safety experts from across associations to work together to improve safety behavior at work. The subject matter experts became more aware of adult learning principles, how to engage adult learners, how to develop curriculum that aligns learning outcomes to assessment and how to make learning relevant to work. The subject matter experts worked with the technology team and by the end of the project were able to determine effectively what technology suited each purpose. They were excited about being a part of development and sharing their expertise. The use of technology brought safety to a new level to improve application of new learning to work.

It will take time to acquire the technology to use in the classroom and it will take time to incorporate the new technology tools effectively. It will be about sharing best practices and attending other training



events that incorporate technology. MHCA is ahead of the curve when it comes to using technology in the classroom. They now have effective teaching strategies for flag person training, personal protective equipment, road builder's safety training and prime contractor that will enhance the way safety is taught in the classroom, in a blended format and on line.

Appendix 1: Updated Timeline

Appendix 2: Northern Pilot Pictures

Appendix 3: Disrupted Pilot Pictures

Appendix 4: Poster MHCA Dissemination Event

Appendix 5: Technology Event Photos March 6th