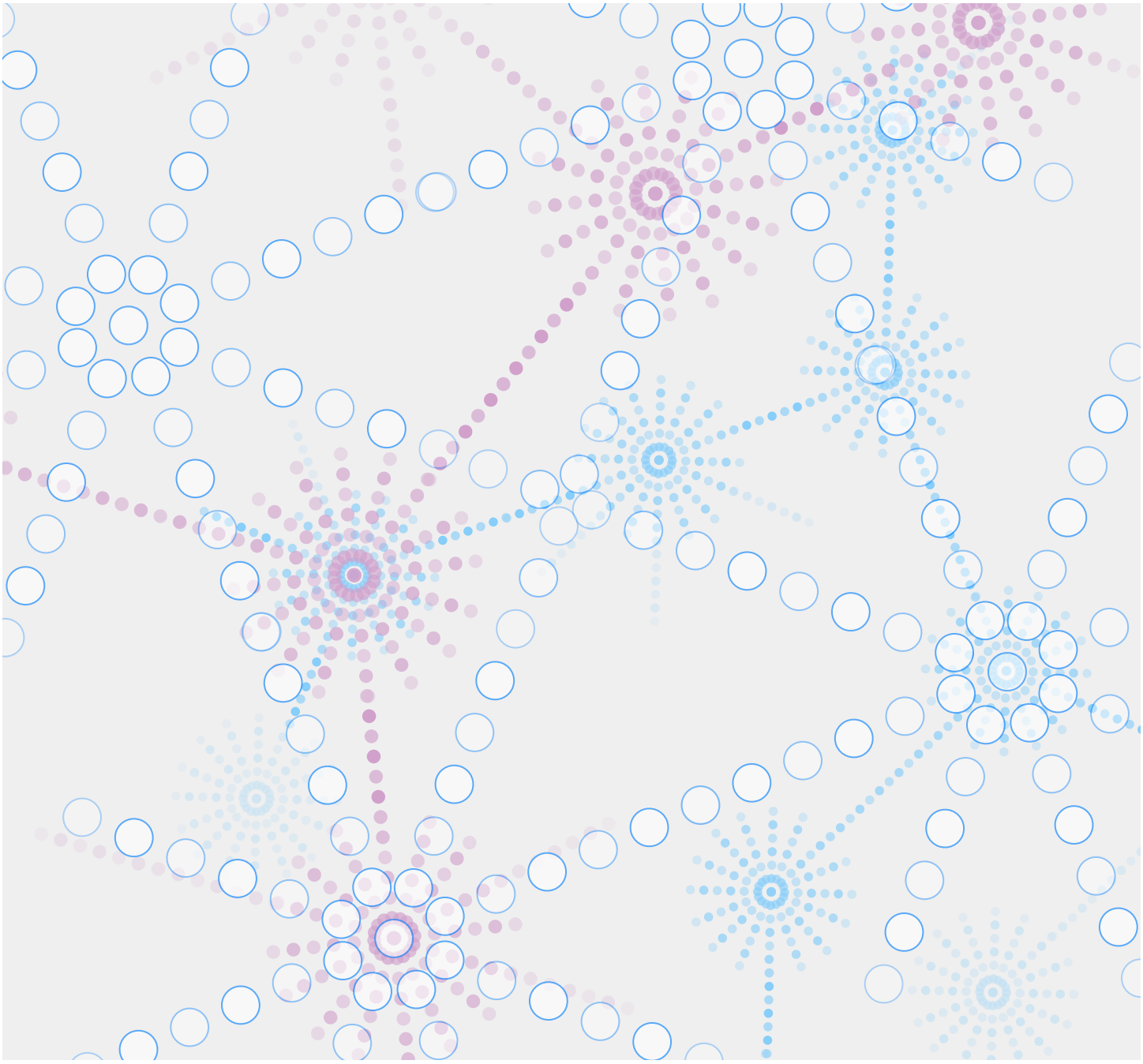

Material Handling 4.0

Final Report

June 2024

Blueprint

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About the Future Skills Centre

The Future Skills Centre (FSC) is a forward-thinking centre for research and collaboration dedicated to driving innovation in skills development so that everyone in Canada can be prepared for the future of work. We partner with policymakers, researchers, practitioners, employers and labour, and post-secondary institutions to solve pressing labour market challenges and ensure that everyone can benefit from relevant lifelong learning opportunities. We are founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada, and are funded by the Government of Canada's Future Skills Program.

About Blueprint

Blueprint was founded on the simple idea that evidence is a powerful tool for change. We work with policymakers and practitioners to create and use evidence to solve complex policy and program challenges. Our vision is a social policy ecosystem where evidence is used to improve lives, build better systems and policies and drive social change.

Our team brings together a multidisciplinary group of professionals with diverse capabilities in policy research, data analysis, design, evaluation, implementation and knowledge mobilization.

As a consortium partner of the Future Skills Centre, Blueprint works with partners and stakeholders to collaboratively generate and use evidence to help solve pressing future skills challenges.

Future Skills Centre | Centre des Compétences futures

Blueprint

Canada

Preface

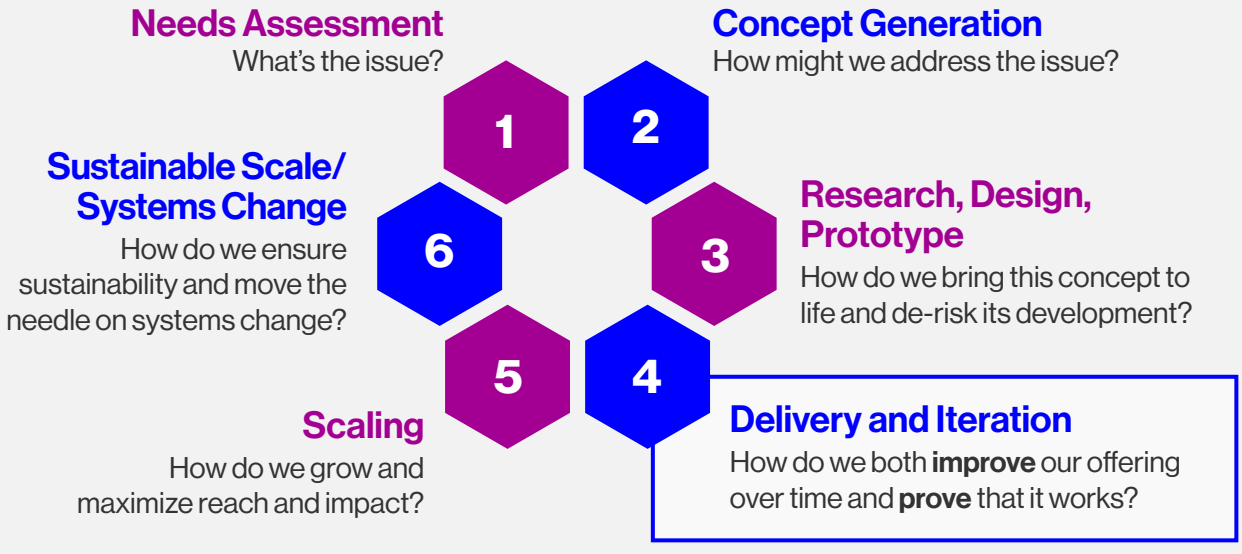
Canada's labour market is rapidly changing. To keep pace with these changes, Canadians need skills development opportunities that respond to demand and apply evidence-informed practices. Many skills development innovations have emerged to meet these needs, but they often face barriers to scaling their interventions beyond the pilot stage.

To address this challenge, the Future Skills Centre (FSC) and Blueprint have launched the Scaling Up Skills Development Portfolio.

In the Scaling Up Skills Development Portfolio, FSC is partnering with ten organizations with promising skills development interventions that have moved toward scaling up their impact. As part of the FSC consortium, Blueprint is working closely with each grantee organization to generate evidence to support their scaling journey. This is an opportunity to disrupt the current "one study at a time" approach to evidence- building in favour of continuous evidence generation and program improvement. The hope is that this approach will better produce the quality and quantity of evidence needed to help promising interventions progress in their scaling journey. For more information about Blueprint's approach to scaling, see our Scaling Social Innovation webpage.

Blueprint's evidence generation approach is aligned with the innovation cycle (**Figure 1**). Our focus for the Scaling Portfolio is to work alongside partner organizations to generate evidence that helps move their interventions through **Stage 4** to **Stage 5** with the ultimate goal of supporting sustainable scale and systems change (**Stage 6**).

Figure 1 | **Innovation Cycle**



About this report

Blueprint is working with each partner organization in the Scaling Up Skills Development Portfolio to continuously collect and monitor data about their intervention, capturing implementation and participant outcomes along the scaling journey.

This final report shares findings from Material Handling 4.0, a skills training program that prepares unemployed and underemployed individuals for jobs in the goods movement sector. The program model addresses the growing demand for technical and employability skills in the sector and creates accessible "on-ramps" into good quality jobs.

Material Handling 4.0 was designed by Mohawk College in Hamilton following engagement with employers involved in all goods movement life cycle segments. It was implemented by Mohawk College and three other partner colleges across Canada (Vancouver Community College, Red River College Polytechnic in Winnipeg, and Nova Scotia Community College) from 2020 to 2022.

Blueprint worked closely with the colleges to generate evidence on how MH4.0 was implemented across different sites and the outcomes experienced by participants.

This report is organized into six sections:

1. **Introduction** (pgs. 6–7) provides background information on MH4.0.
2. **About MH.40** (pgs. 8–14) presents a short overview of the potential sector-based models before describing the MH4.0 model and its scaling pathway.
3. **Methodology** (pgs. 15–18) presents our evidence generation approach, learning agenda, and data sources.
4. **Participant experience** (pg. 19-28) shares findings on how participants experienced MH4.0.
5. **Participant outcomes** (pgs. 29–34) reports findings on employment, job satisfaction, earnings, and the role of work placements in generating employment outcomes.
6. **Concluding thoughts** (pgs. 35-37) summarizes findings, proposed opportunities for continuous improvement, and wider learnings for sector-based models.

1. Introduction

Canada's goods movement industry is undergoing major changes. Businesses are increasingly using the latest digital technologies to improve the efficiency and productivity of their operations. Recent innovations like the Internet of Things and accessible, reliable forms of artificial intelligence, are changing how the industry operates. This shift from stand-alone computers and devices to networks of intelligent, inter-connected devices has been called "Industry 4.0", or "the Fourth Industrial Revolution". Industry 4.0 technologies are being adopted across many industries (e.g., manufacturing, automotive, energy, etc.). See **Box 1**, below, for more information on Industry 4.0.

Industry 4.0 is also changing the skills workers need to perform and make career progress within the goods movement industry. Workers now need to work with complex networks of digital devices capable of making independent decisions. At the same time, they still need to do more 'traditional' technical tasks, like driving a forklift, and have all the employability skills expected by employers.[1]

A recent survey of 225 Canadian supply chain professionals by the Association for Supply Chain Management[2] found that employers need both technical skills, like inventory management and digital skills, and employability skills (or "soft" skills), such as problem-solving and effective communication. This finding was supported by research by Mohawk College, the Ontario Centre for Workforce Innovation, and the Hamilton Port Authority to identify skills needs at the Port. Interviews with Port employers, many of whom were goods movement businesses, found a shortage of technical "Industry 4.0"-type skills and issues with "fit" among candidates.

In response to this shortage, Mohawk College developed Material Handling 4.0 (MH4.0), a sector-based skills training program designed to give participants the technical and employability skills needed to fill vacancies across multiple entry points within the goods movement sector.

MH4.0 is a **dual-client model**, meaning it serves both employers and workers (or individuals seeking to work). The program supports unemployed and underemployed individuals, focusing on youth, newcomers, people without post-secondary education (PSE), and people with low incomes. Program sites are also encouraged to target additional equity-deserving groups based on local needs. MH4.0 provides participants with Industry 4.0 skills training, access to credentials and work placements, and wraparound supports that help participants complete the program and move into employment. The program was developed in close collaboration with local employers to ensure that participants gained skills valued by the sector.

MH4.0 is also a **sector-based model**: it prepares individuals for roles in a given sector, in this case, material handling or goods movement. In particular, it is an "on-ramp" sector-based model[3] because it helps individuals who face barriers to employment and training (and/or work in lower-wage jobs) transition, or "on-ramp," into good-quality entry-level jobs.

1 McKinsey (2022) What is industry 4.0 and the Fourth Industrial Revolution and 4IR? Available at: https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir

2 Association for Supply Chain Management. (2020). 2020 Supply Chain Salary and Career Survey Report Canada. https://www.ascm.org/globalassets/ascm_website_assets/docs/5.9-supply-chain-salary-survey-report-canada.pdf

3 An "on-ramp" sector-based model aims to help people who are unemployed or underemployed to obtain good quality entry-level jobs in growth sectors. They involve a mix of technical skills training and employability skills training, which aims to build "soft skills" like leadership, teamwork, and communication. "On ramps" provide non-traditional talent pipelines for employers. See Weise et. Al. (2019) *On ramps to good jobs: Fueling innovation for the learning ecosystem of the future.* Strada Institute for the Future of Work and Entangled Solutions

In spring 2020, Mohawk College received funding from FSC to **design, develop, and pilot** the MH4.0 model in Hamilton. Mohawk College delivered the program through its City School model, an established program that offers tuition-free post-secondary credits and skills training to community members facing barriers to PSE.

In spring 2021, Mohawk College received additional funding from FSC to **rapidly scale** MH4.0 to three other colleges. This was done to assess the extent to which MH4.0 could be delivered effectively by other post-secondary colleges with different models of delivering support services and community access programs. From 2020 to 2022, MH4.0 was scaled to Vancouver Community College, Red River College Polytechnic, and Nova Scotia Community College. Each of these three colleges has experience delivering education and employment programming for people who face barriers to PSE and is in a city with a goods movement hub.

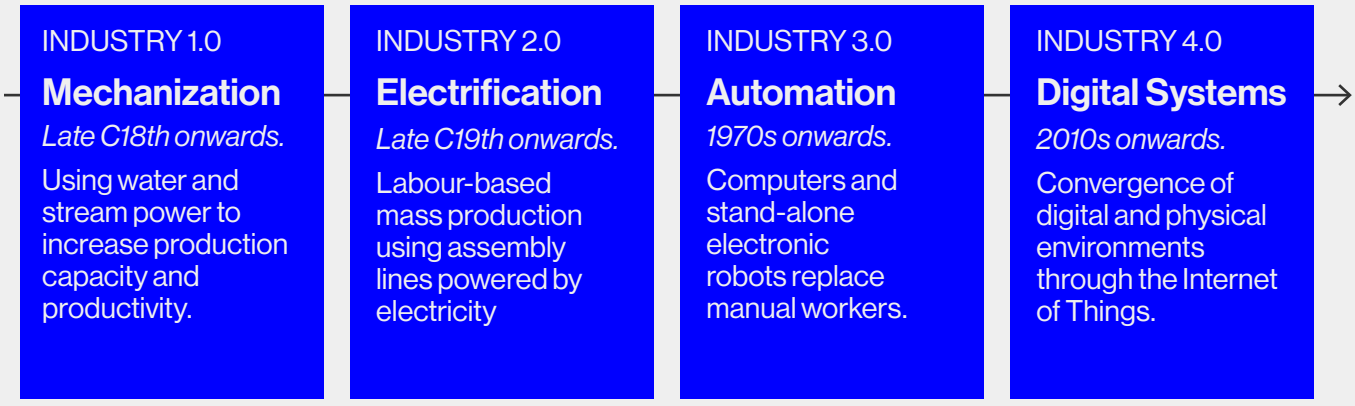
Box 1 | Industry 4.0

"Industry 4.0" is a concept that refers to the increasing integration of digital technologies into manufacturing, industrial processes, logistics, and a range of other industries. Employers in these sectors are adopting technologies, like AI, robotics, and the "internet of things", to improve the efficiency and productivity of their businesses.

The key distinction between Industry 3.0, which saw the rise of computers and automation, and Industry 4.0 is that networks of machines that are digitally connected to one another are able to create and share information and make some decisions without human involvement. For example, in goods movement, if bad weather holds up a shipment of components to a factory, then an inter-connected digital system can proactively account for the delay and adjust the manufacturing process accordingly to minimize the impact of the delay.

Working with these increasingly complex networks of machines as part of Industry 4.0 requires a different skillset to operating a single machine in Industry 3.0. See Figure 2, below, for an overview of the four industrial revolutions. [4]

Figure 2 | Four industrial revolutions



Adapted from International Society of Automation.

4 International Society for Automation (2020) What is Industry 4.0? Available at: https://blog.isa.org/what-is-industry-40

2. About MH4.0

2.1. About sector-based models

Sector-based models prepare individuals for specific industry sectors. They address the needs of both employers and workers. For employers, sector-based models align training with in-demand occupations by working with stakeholders in a specific sector to identify their skills needs and designing training that responds to them. For workers, sector-based models try to provide an entry point into 'good quality' jobs in growth industries, which offer decent wages, secure tenure, and opportunities for career progress.

Sector-based models typically have some, or all, of the following features:

- Intensive screening of participants pre-enrollment to check for motivation, suitability, and readiness
- Sector-specific pre-employment and career readiness services to ensure participants are prepared for employment in the target sector
- Sector-specific occupational skills training to equip participants with skills employers need
- Job development and placement services to help program graduates find jobs in the target sector
- Retention and advancement services to help participants keep their jobs and make career progress

The MH4.0 model, as discussed in the next section, focuses on the third and fourth components of sector-based models: occupational skills training and job development and placement services.

There is strong evidence to show that sector-based models can be effective at delivering outcomes for workers and employers.[5] However, there is also evidence that shows sector-based models are highly challenging to design and deliver.

Developing training programs that meet the needs of employers while designing and coordinating wrap-around supports is time-consuming. It requires a thorough understanding of industry skills needs, the barriers to work faced by the target groups, and high levels of collaboration and coordination between different organizations. For this reason, development timelines can be long. It typically takes months, or even years, from the initial idea for a program to the first cohort entering training. This time lag means that sector-based models can be vulnerable to changes in the labour market (e.g., target sectors may no longer be experiencing the high levels of labour demand seen when the program was first conceived).

Delivery requires a broad range of expertise, including how to serve participants with complex needs, how to work with employers, deep industry knowledge, training design and delivery, and cross-organizational collaboration and coordination skills. Implementing sector-based models can be so complex that even experienced, high-capacity service providers with strong existing industry relationships take time to reach full delivery maturity.[6]

5 Myers, Karen., Harding, Simon., and Pasolli, Kelly. 2021. "Skills Training That Works: Lessons from Demand-Driven Approaches." IRPP. Available at: https://irpp.org/research-studies/skills-training-that-works-lessons-from-demanddriven-approaches/

6 Hendra, Richard. et al. 2016. "Encouraging Evidence on a Sector-Focused Advancement Strategy Two-Year: Impacts from the WorkAdvance Demonstration." MRDC.

Given the challenges posed in designing and delivering sector-based models, it can be hard to scale successful models. All too often, the success of a sector-based model depends on a handful of practitioners working at a particular service provider who combine to "work magic". How to effectively scale promising sector-based models beyond a single site remains a key evidence gap.

2.2. The MH4.0 model

MH4.0 helps unemployed and underemployed individuals to develop in-demand skills and find, retain, and grow within good quality jobs in the goods movement sector. The program has four target populations (youth, newcomers, people without PSE, and people with low incomes), along with additional equity-deserving populations determined by each site.

The MH4.0 model has the following components (summarized in **Figure 3**):

- **Training:** Participants received training in two areas: (1) **technical training**[7] in key "Industry 4.0" skills required in the goods movement sector (e.g., digital literacy) and (2) **employability skills training** (e.g., communication, teamwork, and problem-solving) (see **Box 2**). Training was delivered in-person and online. The mix of in-person and online delivery varied site to site.
- **Industry certifications and micro-credentials:** Participants could earn one of two established industry certifications from the US Manufacturing Skill Standards Council: (1) Certified Logistics Associate (*Logistics Associate micro-certificate*) and (2) Certified Logistics Technician (*Logistics Associate+ micro-certificate*). They could also earn five new micro-credentials for demonstrating competency in 21st Century employability skills (see **Box 2**). 21st Century skills were assessed using versions of the American Association of Colleges and Universities' Valid Assessment of Learning and Undergraduate Education (VALUE) rubrics , a set of rubrics[8] originally developed to evaluate learning performance in these skills at the undergraduate level. Credentials were issued by the participating colleges. It was hypothesised that showing a micro-credential to an employer, even one that is newly developed and unfamiliar to employers, could indicate candidate competency, since skills must be demonstrated to earn the credential.
- **Work placement:** Upon completion of the training, participants had the option of pursuing a two-to-three-week work placement with partner employers in the local goods movement sector. Participants were paid for their work placement; employers received a wage subsidy.
- **Wraparound supports:** Throughout the program, all sites offered reimbursement for childcare costs incurred because of participating in the program, help purchasing PPE and other work equipment, and referrals to other services. Participants across all sites also received support from a Job Developer, who worked with partner employers to arrange work placements, and a Learning Support Officer, who provided learning and academic guidance. There were also site-specific wraparound supports, which reflected local needs (discussed further in **Section 2.3.3**).

7 Technical training was based on existing training from the Manufacturing Skills Standards Council, a US-based, industry-led training organization.

8 The American Association of Colleges and Universities' VALUE rubrics was chosen as there is no equivalent Canadian tool. The VALUE rubrics are widely recognised in Canada.

Figure 3 | MH4.0 components

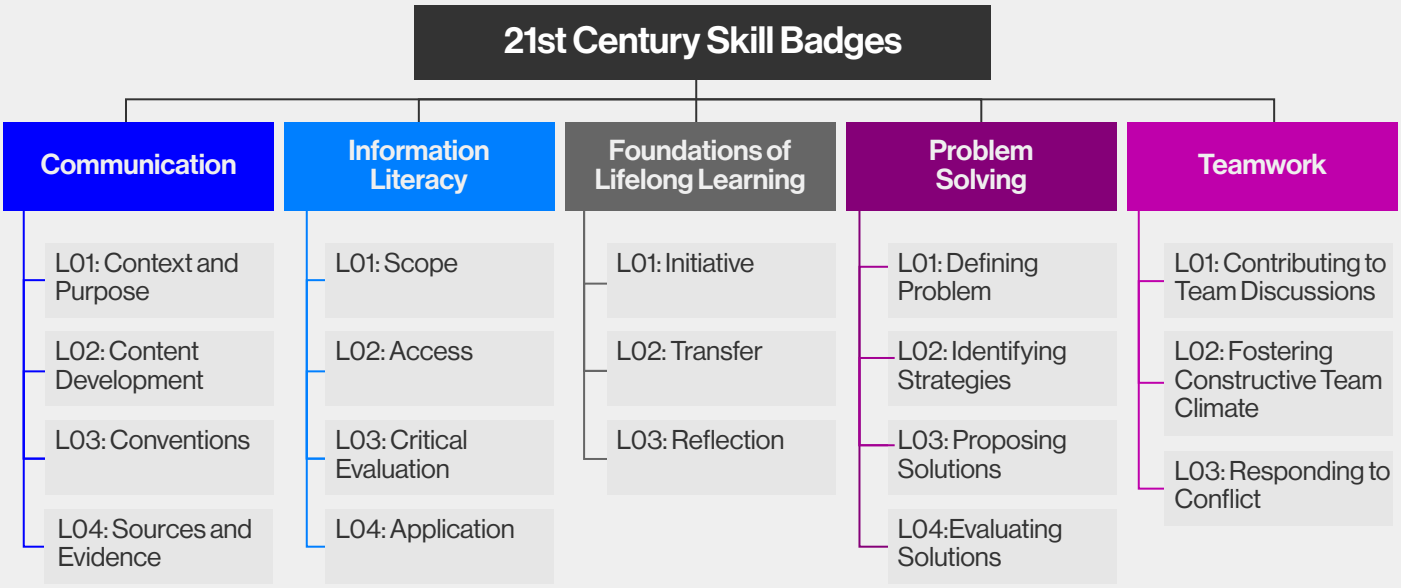
Box 2 | MH4.0's micro credentials

MH4.0 offered micro credentials in 21st Century employability skills. A total of five micro-credentials were available: Communication, Information Literacy, Foundations of Lifelong Learning, Problem Solving, and Teamwork. Each micro-credential comprised three or four learning outcomes, which participants had to demonstrate to an identified performance level or threshold to earn the micro-credential (**Figure 3**).

The learning outcomes were adapted from the criteria comprising the corresponding American Association of Colleges and Universities' Valid Assessment of Learning and Undergraduate Education (VALUE) rubrics, a set of rubrics used to evaluate learning performance across 16 21st Century skills at the undergraduate level. Research and engagement with local employers, along with analysis of local job postings, determined which of these skills would be the focus of the micro-credentials. Learning outcomes were benchmarked and modified to align with expectations of entry-level employment in material handling. Benchmark-level performance in MH4.0 was typically consistent with the benchmarks set in the original VALUE rubrics.

Instructors assessed participants' skills through formal assignments and informal observation. To earn a micro-credential participants had to meet the threshold for all learning outcomes, which involved demonstrating the skills in context that was sector-relevant and in line with tasks expected in entry-level jobs. There were two levels of micro-credential: benchmark and benchmark+ (to acknowledge exceptional performance). Scoring was calibrated through discussions between program instructors and lead assessors to attempt to maintain consistency across cohorts and sites.

Figure 4 | MH4.0 micro-credentials and learning outcomes



2.3 MH4.0's scaling journey

2.3.1 Implementing MH4.0 at Mohawk College

Mohawk College delivered MH4.0 through one of its main access programs: City School by Mohawk, which offers tuition-free post-secondary credits and skills training to people facing barriers to PSE. As a community economic and social development strategy, City School targets low-income residents in Hamilton neighbourhoods with lower socio-economic status, with priority given to those without post-secondary experience. City School is a well-established model, distinct to Mohawk College, which has undergone several years of refinement and optimization.[9]

By designing, testing, and refining MH4.0 in its pilot stage, Mohawk College set the foundation for scaling the program and building evidence on how to effectively do so for a sector-based model.

Box 3 | More about Mohawk College's City School

Since its establishment in 2015, Mohawk College's City School has offered over 80 courses and a variety of bundled programs to more than 4,000 learners, more than 1,000 of whom have transferred to Mohawk College for full- or part-time studies. City School operates three neighbourhood-based classrooms, two mobile classrooms, and numerous pop-up locations, all of which offer college-level courses and vocational skills workshops.

Participants in City School programs get access to a range of wraparound supports, which vary by program. City School also develops and maintains strong relationships with local employers to better understand their skills needs. It does this through regular networking events and industry consultations, which inform course development and training design.

2.3.2 Expanding MH4.0 to partner colleges

Mohawk College used a systematic, intentional, and evidence-informed process for identifying partner colleges for the MH4.0 model.

Mohawk College began by conducting a labour market scan to identify colleges across Canada located in cities with thriving goods movement industries. Mohawk also considered other critical success factors such as a college's workforce development goals, their track record in working with individuals who face barriers to PSE and their prior engagement with the non-profit sector and employers in the goods movement sector. Although partner colleges would not be asked to completely replicate the City School model, they would be required to provide appropriate wraparound supports and services for participants.

The labour market scan identified three colleges that were a strong fit for the MH4.0 model: Vancouver Community College, Red River College Polytechnic, and Nova Scotia Community College. Based on this finding, Mohawk College began discussions with these colleges to gauge their level of interest and work

9 Bourke, A., Tascon, C., Vanderveken, J., Ecker, E., & Campbell, M. (2019) The City School Partnership: A community-built responses to improving access to education – final research report. SSHRC and Mohawk College.

out how MH4.0 could be adapted to their needs and programming. Upon joining the initiative, these three colleges, along with Mohawk College, formed the Four College Alliance, a partnership for delivering MH4.0 across all four sites.

2.3.3 Adapting MH4.0 to meet local needs

To implement MH4.0, partner colleges relied on their existing activities, provisions, and resources for delivering skills training to participants who face barriers to PSE. In the spirit of access programming, partner colleges adapted MH4.0 to better meet local needs and align with their existing services and supports, including changes to:

- **Target participants:** As delivery progressed, target groups across sites expanded to reflect the needs of local communities. For example, Red River College Polytechnic identified a need among Indigenous learners and adapted their recruitment and delivery accordingly.
- **Completion criteria:** Partner colleges adapted MH4.0's program completion criteria to reflect learner needs and experiences (see **Figure 5**). Colleges serving populations with lower PSE completion rates had less stringent completion criteria to make MH4.0 more realistic and achievable. Where participants had a higher level of educational attainment, like Vancouver Community College, less emphasis was placed on the micro-credentials, because some felt these offered the greatest benefit to those with a high school education or less. Completion criteria were also adjusted to fit into existing departmental administration structures and processes that governed credentialling. This was an important aspect of the program model, as it allowed each institution to respond to the needs of program participants and the local employment context.
- **Wraparound supports and services:** The supports available to participants varied across colleges. **Figure 4**, below, shows the core model, which was consistent across all sites, and additional site-specific supports that responded to local needs. For example, Red River College Polytechnic offered a six-week English language pathway, as most of their participants did not speak English as a first language. The College also offered supports and counselling for Indigenous participants, run in partnership with its School of Indigenous Education. Similarly, Nova Scotia Community College provided ASL interpreters for two deaf participants.

Overall, partner colleges were able to implement the core components of the MH4.0 model, along with site-specific supports and adaptations that met local needs. This implementation happened during the COVID-19 pandemic, when many other interventions in FSC's Scaling Up Skills Development Portfolio faced significant recruitment and delivery challenges. The pandemic affected MH4.0 timelines (see **Section 3.4** for information about delays with surveys and interviews) and informed participant perspectives on the labour market, which is an important lens through which to view MH4.0's scaling journey and outcomes.

Figure 5 | Core model and site-specific adaptations

Core model

- Skills training
- Micro-credentials (and optional certifications)
- Work placement (paid)
- Employment support and case management
  - Min. weekly check-ins with Job Developer
  - Min. 1-month job retention support
  - Referrals to employment services
- Wraparound supports
  - Childcare reimbursement
  - PPE and all other work supplies
  - Referrals to local support services (e.g., legal clinics, housing services)

Additional College-specific supports

- Language support for newcomers to Canada/ English-language learners
- Supports and counselling, including those specific for Indigenous participants and participants with disabilities
- Enhanced recruitment and delivery
- Sign language interpretation
- First Aid training
- Forklift training
- WHMIS training
- Nutrition allowance
- Tutoring services

Completion criteria by site

Institution	Completion Criteria
Mohawk College	Earn at least four micro-credentials, of which at least one is a Logistics micro-credential
Nova Scotia Community College	**Cohort 1 and 2:** Earn at least one micro-credential **Cohort 3:** Earn at least one micro-credential OR attend 80% of classes
Red River College Polytechnic	Earn at least four micro-credentials, of which at least one is a Logistics micro-credential
Vancouver Community College	All of the following: • Attend at least 80% sessions (in-person and virtual) • Complete all Certified Logistics Associate and Certified Logistics Technician modules • Complete all 21st Century skills assignments • Complete Forklift and WHMIS training

3. Methodology

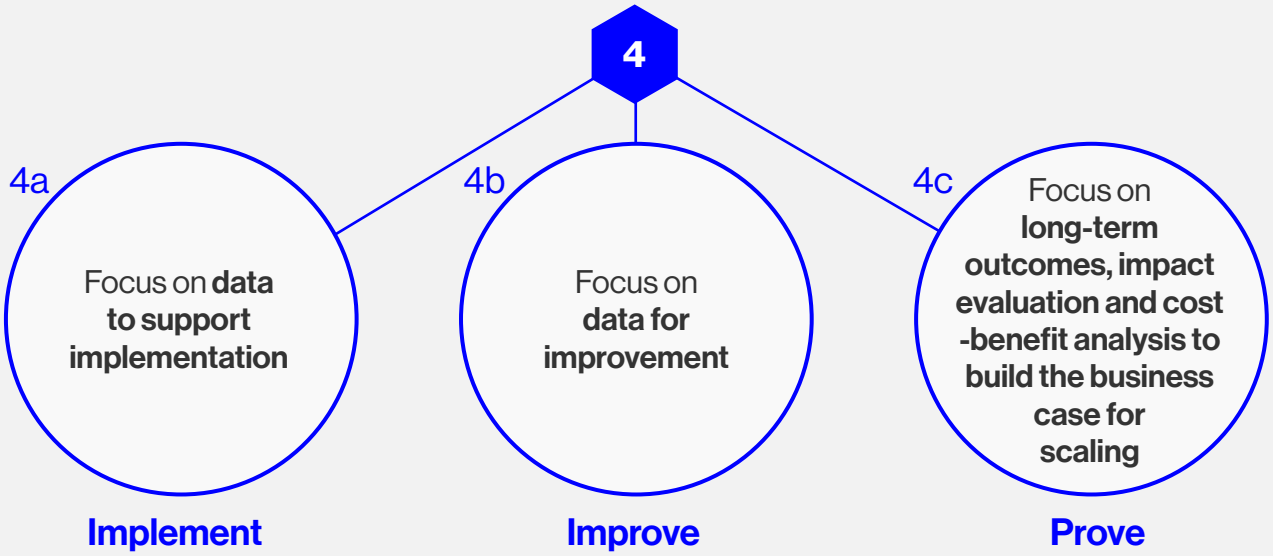
3.1. Our evidence generation approach

To support the scaling of promising interventions, Blueprint developed a novel approach to evidence generation that corresponds to the stages of the innovation cycle (see page 14, above). By understanding an intervention's stage of development, we can determine the most appropriate tools and approaches to advance it to the next stage. More details on our evidence generation approach can be found in Box 5 of the Scaling Design Report.

Like all the other interventions in the Portfolio, MH4.0 was in Stage 4 of the innovation cycle: **delivery and iteration**. Stage 4 is further broken down into 3 levels of delivery maturity: *Implement, Improve*, and *Prove* (**Figure 6**). As MH4.0 has already been delivered, we categorised it at **Stage 4b** of the innovation cycle, Improve, where evidence generation is focused on data to support continuous improvement.

While our evidence generation approach is tailored to an intervention's stage of development, we have developed a common measurement approach for all the projects in the Portfolio to ensure that we can generate Portfolio-wide evidence (see **Box 4**, on page 16).

Figure 6 | **Phases of Delivery Maturity**



Box 4 | Common Outcomes Framework

Our measurement approach includes indicators that are specific to an intervention as well as a set of common indicators that are measured for every intervention in the Portfolio.

These common indicators are drawn from Blueprint's Common Outcomes Framework, which was developed in consultation with our partners and was informed by review of employment-related outcomes frameworks and measurement approaches both within Canada and internationally. They include:

- Intermediate outcomes that reflect "in-program" participant experiences and gains (e.g. program satisfaction and skills development).
- Long-term outcomes, such as employment and educational attainment.

Using a consistent approach to measuring outcomes is part of our commitment to understanding how each intervention in the Portfolio is reaching people across Canada and allows us to measure long term outcomes using Statistics Canada's Social Data Linking Environment. For more information on Blueprint's Common Outcomes Framework, see **Appendix A**.

3.2. Learning agenda

This is the final report for MH4.0. It covers the entire program delivery period (May 2021 to December 2022), with additional data collection between May 2023 and September 2023. During this period, 238 people participated in MH4.0 in 21 cohorts.

We report on two areas of inquiry that are guided by the following questions:

1. **Participant experiences:**
   a. **Reach and completion:** Is MH4.0 reaching its target populations? How many participants complete the program?
   b. **Program satisfaction:** Are participants satisfied with the program? How satisfied are they with the VALUE rubric, micro-credentials, and work placement?
2. **Participant outcomes:**
   a. **Employment:** Do participants find employment? What is the role of the work placement in finding employment?
   b. **Job satisfaction:** Are participants satisfied with their jobs?
   c. **Earnings:** Do participants experience higher earnings through the program?

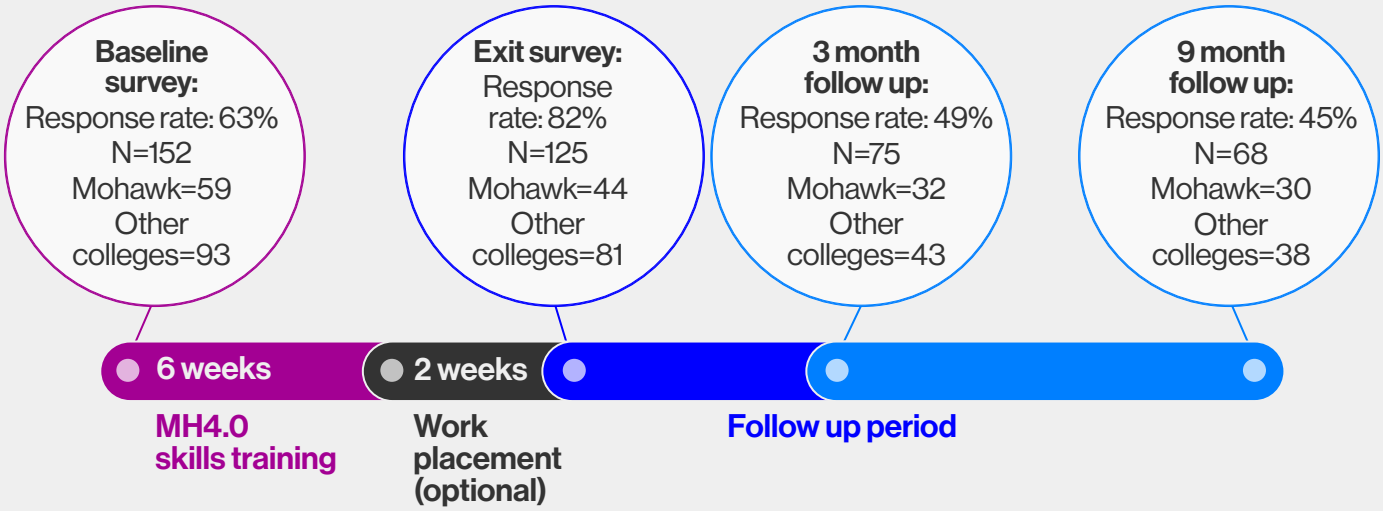
3.3. Data sources

Data was collected through a mix of surveys and interviews across the project, with quantitative and qualitative data gathered at different time points. We used a longitudinal research design to measure participant outcomes, which involved collecting and measuring changes in outcomes from baseline to program exit and at three- and nine-month follow-up points.

Figure 7 (below) maps the survey data collection points onto the participant journey through MH4.0. 152 participants consented to participate in the research. The sample size decreases over time as not all participants respond to all the surveys. The findings presented in this report are based on the complete dataset.

In addition to the four participant surveys outlined below, we interviewed nine participants (two at Mohawk College, seven at the other colleges) at varying points following program completion. Mohawk College also conducted interviews and focus groups with 15 faculty, 32 staff, and six employers across the partner colleges and provided Blueprint with high-level themes that arose from those engagements. Administrative data was used for program enrollment and completion figures.

Figure 7 | Phases of Delivery Maturity



Survey	Content
Baseline	Participant socio-demographics, motivation for joining the program, employment status and history
Exit	Program satisfaction, post-program plans, employment and education outcomes
3- and 9-month follow ups	Post-program employment and education outcomes

3.4 Data limitations

Four main limitations affected sample sizes and data collection timelines, which restrict the analyses we can perform with the survey findings:

1. **Missed and late survey administration:** Staff turnover at Mohawk College contributed to a pause in data collection from February to August 2023. As a result, three cohorts (14%, 3/21) did not receive the 3-month follow-up survey, seven cohorts (33%, 7/21) did not receive the 9-month survey, and two cohorts (10%, 2/21) received the 9-month survey late (one at 10.5 months and one at 11.5 months post-program exit). This means sample sizes for 3- and 9-month surveys are smaller than anticipated (beyond the expected drop-off in participant survey completion over time), and some participants have different lengths of time between program exit and survey reporting. We do not expect differences in survey administration timelines to affect the generalizability of our findings to the full MH4.0 participant population.
2. **Inability to conduct site-specific outcomes analysis:** Due to diminishing response rates at the 3- and 9-month follow-up surveys, sample sizes were not large enough to conduct site-level analysis of employment rates, job satisfaction, earnings, and work placements. This means we cannot assess site differences in program outcomes, which would be valuable given site variations in priority populations, program supports, completion criteria, and delivery times and methods.
3. **Limited ability to report on employment outcomes by sector:** We are unable to report on employment outcomes by sector or confidently determine if the jobs participants secured were in the goods movement sector. In addition to small sample sizes, this is because data on the employment sector is relatively incomplete. As a result, we had to rely on manual coding based on our understanding of job titles in the goods movement sector. Further, at program exit, questions about employment were phrased using "in the last seven days", so some participants may have been enrolled in their work placement within seven days prior and responded about their placement.
4. **Fewer and condensed participant interviews:** In response to staff turnover at Mohawk College, Blueprint assumed responsibility for participant interviews. Since this transition happened later in the research period, fewer interviews were conducted than planned, and all interviews took place toward the end of the data collection period.

4. Participant experience

4.1. Reach and completion

This section uses program administrative data and information from the baseline survey to assess the extent to which MH4.0 met its recruitment targets and reached its target populations. It also presents data on completion rates.

Program recruitment

MH4.0 was very close to meeting its recruitment target. The overall participant target was 243 across 18 cohorts. Mohawk College aimed to engage 135 participants, and the partner colleges had a combined target of 108 participants or 36 per college.

The target was lower for partner colleges as they had not delivered MH4.0 before and needed time to build a recruitment pathway, whereas Mohawk College had undertaken a pilot phase and had more experience with similar programming than partner sites. **Table 1**, below, shows MH4.0's targets and actual recruitment numbers. Overall, Mohawk College and partners ran three more cohorts than targeted, reaching 98% (238/243) of their recruitment target.

Table 1 | Cohort and participation targets

	Cohort target	Cohorts delivered	Participant target	Participants reached
Mohawk College	9	10	135	102
Red River College Polytechnic	3	4	36	59
Vancouver Community College	3	4	36	36
Nova Scotia Community College	3	3	36	41
TOTAL	**18**	**21**	**243**	**238**

Population engagement

Among unemployed and underemployed individuals, MH4.0 was focused on engaging youth, newcomers, people without post-secondary education (PSE), and people with low income. **Table 2** shows the extent to which MH4.0 reached these populations based on information from the baseline survey. Overall, 74% of participants were unemployed, 77% had a household income of $40,000 or lower, and 88% were at least one of youth, newcomers, or people without PSE.

Table 2 | Proportion of participants with target group characteristics

	Youth (under 35)	Newcomers (born outside Canada)	People without PSE	People without employment	People with low incomes [a,b]
All sites (N=152)	42%	59%	42%	74%	77%
Mohawk College (N=59)	44%	41%	53%	79%	83%
Nova Scotia Community College (N=30)	63%	53%	53%	50%	68%
Red River College Polytechnic (N=29)	34%	76%	28%	86%	71%
Vancouver Community College (N=34)	26%	79%	26%	74%	82%

Source: Participant baseline survey

a Total household income $40,000 or below

b Sample sizes: all sites (N=93), Mohawk College (N=36), Nova Scotia Community College (N=19), Red River College Polytechnic (N=21), Vancouver Community College (N=17).

Table 2 also shows some **inter-site variation** in target group participation. For example:

- **Youth** participation was highest at Nova Scotia Community College (63%, compared to 26-44% at other sites)
- **Newcomer** participation was highest at Vancouver Community College and Red River College Polytechnic (79% and 76%, respectively, compared to 41% and 53% at other sites)
- Participation among **people without PSE** was highest at Mohawk College and Nova Scotia Community College (53% each, compared to 26% and 28% at other sites)
- Participation among **people without employment** was highest at Red River College Polytechnic (86%, compared 50-79% at other sites)
- Participation among **people with low incomes** was highest at Mohawk College and Vancouver Community College (83% and 82%, respectively, compared to 68% and 71% at other sites)

Program participation

Program completion rates were high overall and at most delivery sites. Ninety percent (90%, 126/140)[10] of participants completed the program.

There was also variation in completion rates across sites, as shown by **Table 3**, below. Completion rates are lower at Mohawk College (76%) than at the other colleges (97-100%). This variation is likely due to differences in the chosen program completion criteria between the colleges. The differences in criteria were attributed to local conditions and needs, resulting in some partner colleges opting for completion criteria that were less stringent than those at Mohawk College, which likely contributed to the differences in rates across the institutions.

Table 3 | Program completion rates by site

Site	Completion criteria	Completion rate
Mohawk College	Earn at least four micro-credentials, of which at least one is a Logistics micro-credential	**76%** (37/49)
Nova Scotia Community College	Cohort 1 and 2: Earn at least one micro-credential Cohort 3: Earn at least one micro-credential OR attend 80% of classes	**100%** (30/30)
Red River College Polytechnic	Earn at least four micro-credentials, of which at least one is a Logistics micro-credential	**97%** (28/29)
Vancouver Community College	• Attend at least 80% sessions (in-person and virtual) • Complete all CLA and CLT modules • Complete all 21st Century skills assignments • Complete Forklift and WHMIS training	**97%** (31/32)
Source: Administrative data	**Total**	**90%** (126/140)

10 Of the 152 participants who consented to research, completion data is available for 140 participants. This is because Mohawk College tracks completion data for only participants who earn a micro-credential, and 12 participants did not.

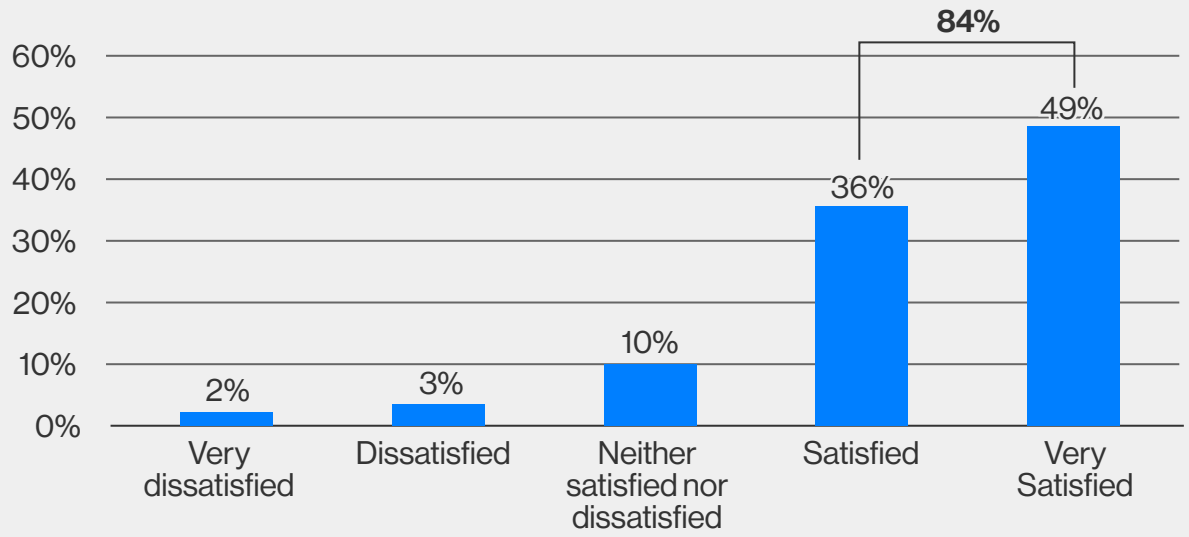
4.2. Program satisfaction

This section examines the extent to which participants were satisfied with the program overall and its various components, based on information from the exit surveys and participant and staff interviews.

Participation satisfaction

Satisfaction with MH4.0 was high (Figure 8). Eighty-four percent (97/115) were very satisfied or satisfied with the overall program and 86% (99/115) reported that it met or exceeded expectations. Eighty-three percent of participants (95/115) had already recommended MH4.0 to someone or are very likely or likely to do so.

Figure 8 | Overall program satisfaction ratings (N=115)



Source: Participant exit survey

Table 4 shows overall program satisfaction by site. As the table shows, satisfaction rates at Nova Scotia Community College were lower than the other colleges: 52% were very satisfied or somewhat satisfied with the overall program, 70% reported that the program met or exceeded expectations, and 61% said they had already recommended the program, or were very likely or likely to do so. We must exercise some caution when interpreting this finding as the sample size is small (N=23).

Further investigation is needed to understand why satisfaction rates at this site are lower, but we can suggest some possible reasons related to recruitment pathways and work placements. For its first cohort, Nova Scotia Community College incorporated MH4.0 into its Women Unlimited program for women in trades, as a mandatory program component. Firstly, women taking these training courses may have found MH4.0 was a somewhat different experience from the more hands-on programs for which they had signed up. Secondly, these women had higher rates of employment at baseline and possibly fewer barriers to workforce participation than MH4.0's target demographic, which could mean that MH4.0 was misaligned with their needs. We also know that this site only had one employer partner for work placements and given lower satisfaction rates with this program component (discussed in the following section), it may have played a role in overall satisfaction.

Table 4 | Participant satisfaction rate by site

Site	% very satisfied or satisfied with the program	% very likely, likely, or already recommended the program
Mohawk College	**86%** (36/41)	**83%** (34/41)
Nova Scotia Community College	**52%** (12/23)	**61%** (14/23)
Red River College Polytechnic	**95%** (20/21)	**90%** (19/21)
Vancouver Community College	**97%** (29/30)	**93%** (28/30)

Program component satisfaction

Participant satisfaction varied between program components (**Table 7**). Satisfaction was highest with **program staff** (ranging from 82% to 89% who were very satisfied or satisfied) and lowest for **VALUE rubrics** (70% very satisfied or satisfied) and **work placements** (69% very satisfied or satisfied). Satisfaction with each program component is discussed in the following sub-sections.

Almost all program components have lower rates of satisfaction than the MH4.0 program overall. Further investigation is needed to understand the factors that contribute to program satisfaction, including and in addition to specific components of the program.

Table 5 | Satisfaction with program components

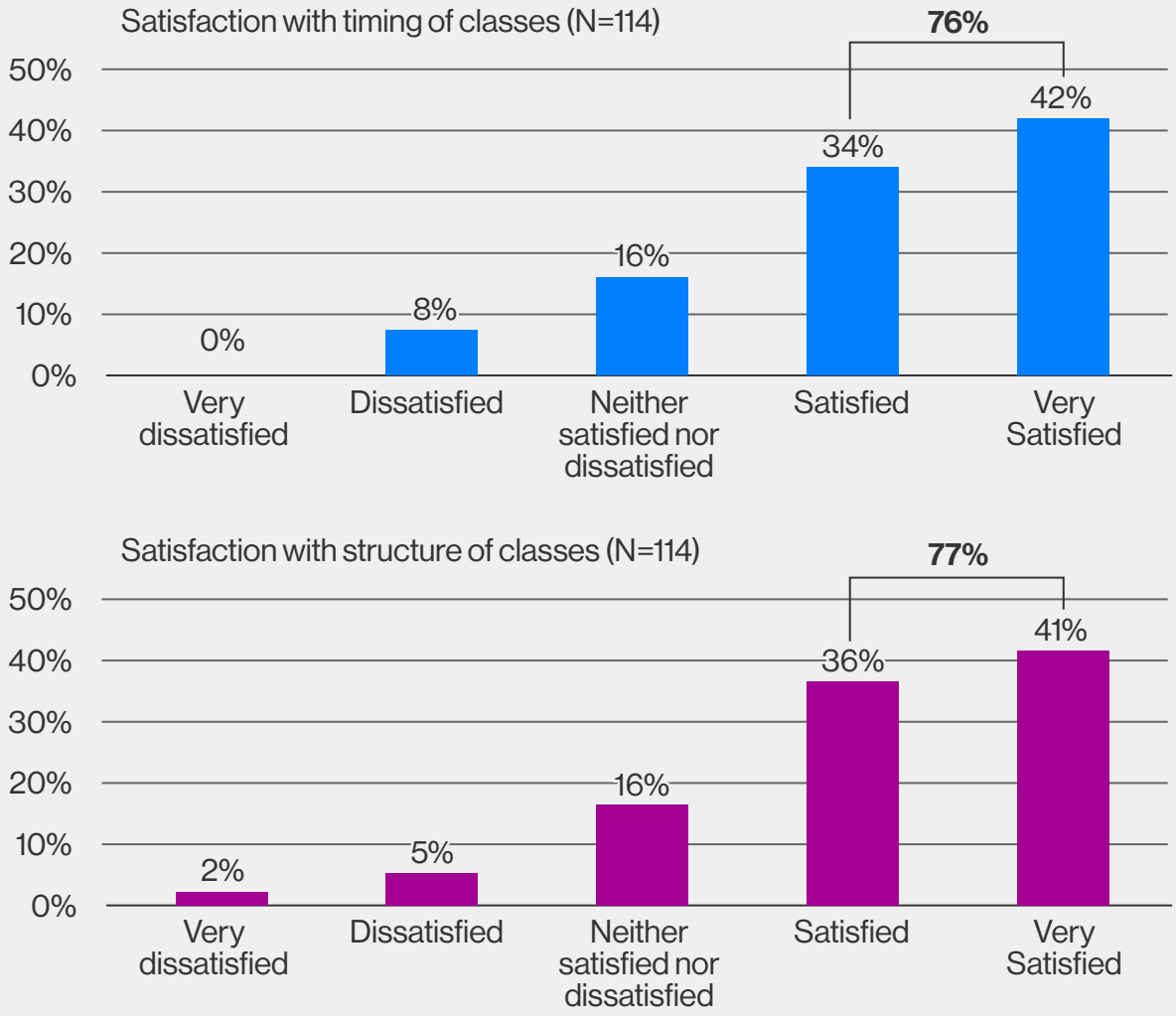
Program component	% very satisfied or satisfied
Overall program	**84% (97/115)**
Course instructors	**89%** (101/114)
Learning Support Officers	**83%** (95/114)
Job Developers	**82%** (94/114)
Micro-credentials	**78%** (88/113)
Structure of classes	**77%** (88/114)
Timing of classes	**76%** (87/114)
VALUE rubrics	**70%** (80/114)
Work placements	**69%** (44/64)*

Source: Participant exit survey and administrative data
*Among those who completed a work placement

Classes

About three-quarters of participants were very satisfied or satisfied with the timing (76%) and structure (77%) of classes in the training (**Figure 9**).

Figure 9 | Satisfaction with structure and timing of classes



Source: Participant exit survey

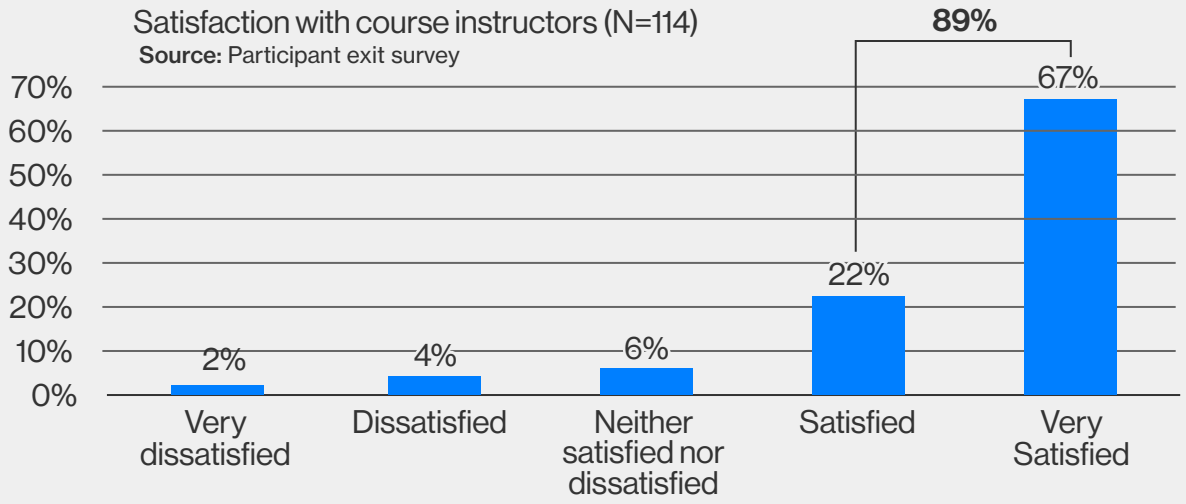
About half of participants felt that the lectures (47%) and class activities (47%) were easy or very easy. This assertion was repeated in interviews, where participants shared that the course content was too basic and could be learned on the job.

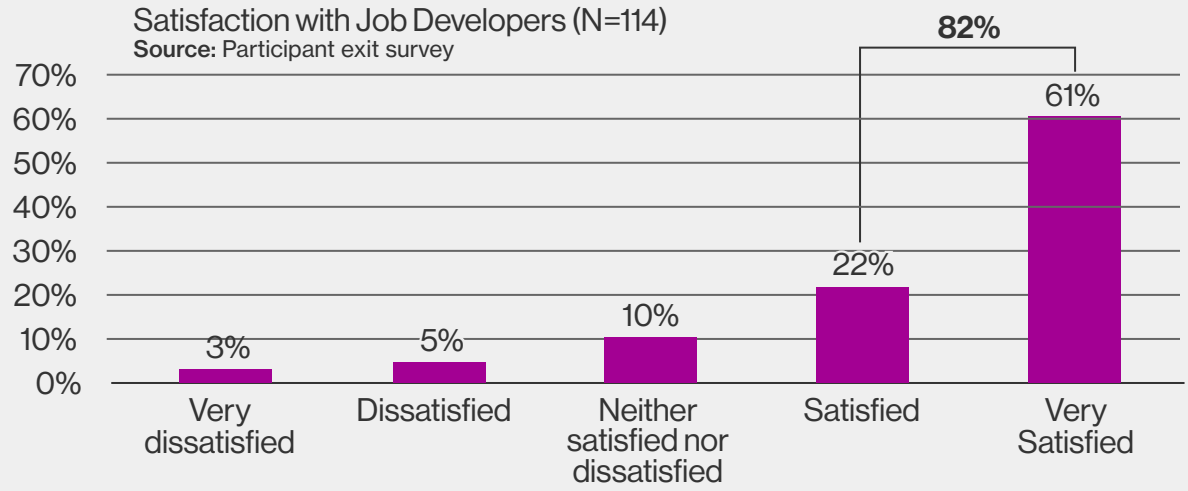
In the interviews, participants expressed a desire for more practical, hands-on experience, which they felt employers valued more than classroom-based instruction. Participants also wanted a greater emphasis on learning industry language and terminology and more written and visual materials to aid learning. These sentiments were echoed by the interviews carried out by Mohawk College.

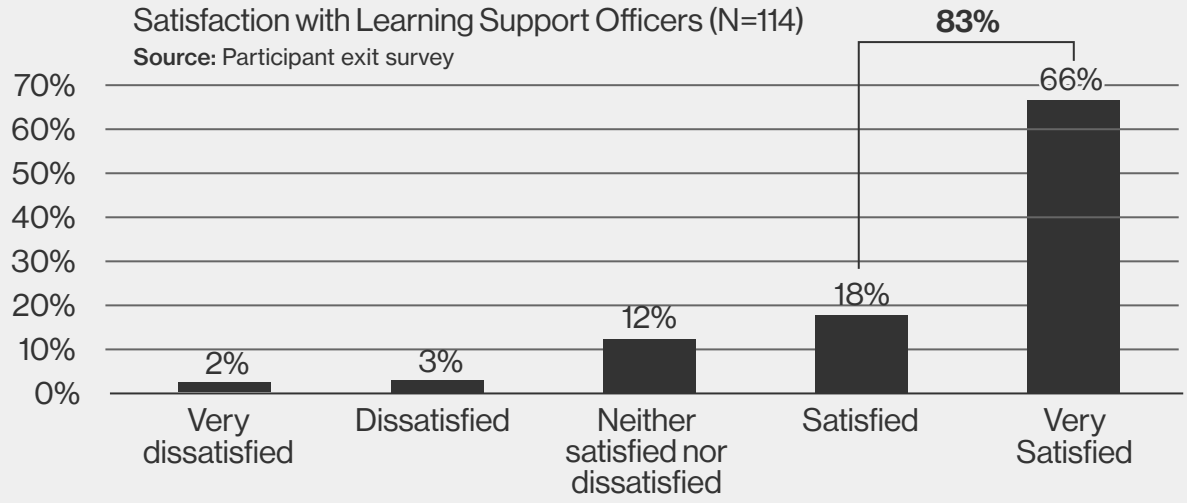
Program staff

Participants were highly satisfied with program staff (**Figure 10**). Eighty-nine percent were very satisfied or satisfied with course instructors, 82% with Job Developers, and 83% with Learning Support Officers. In the interviews, some participants

Figure 10 | Satisfaction with program staff



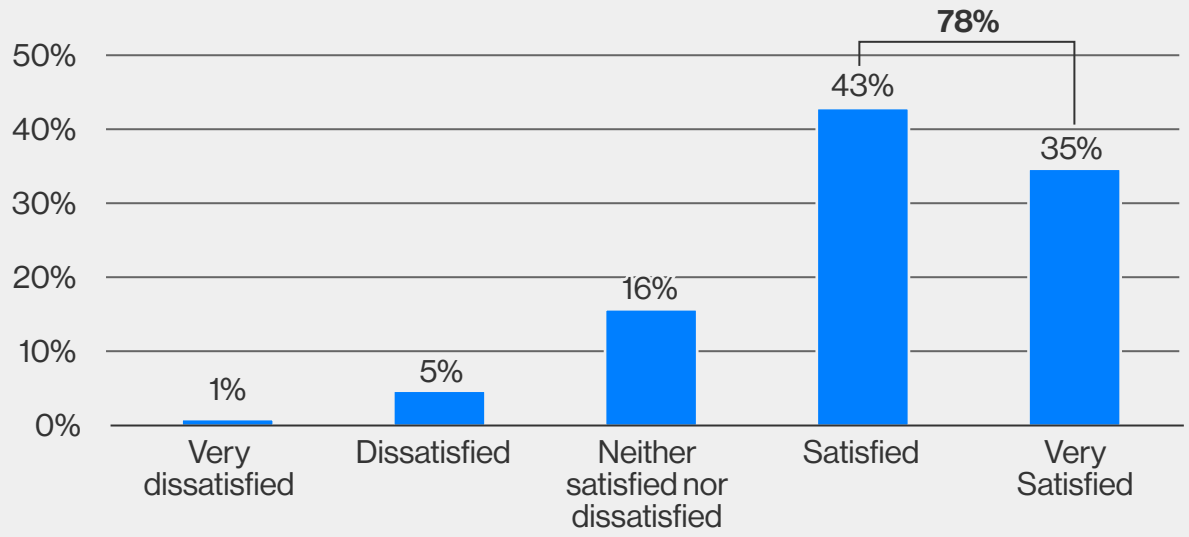




Micro-credentials

Participant satisfaction with micro-credentials was fairly high, with 78% (88/113) of respondents very satisfied or satisfied with them (**Figure 11**). Many participants felt that micro-credentials were important to their employment journeys: 68% (78/114) of respondents reported that micro-credentials are extremely important or important in being hired and retained.

Figure 11 | Satisfaction with micro-credentials (N=113)



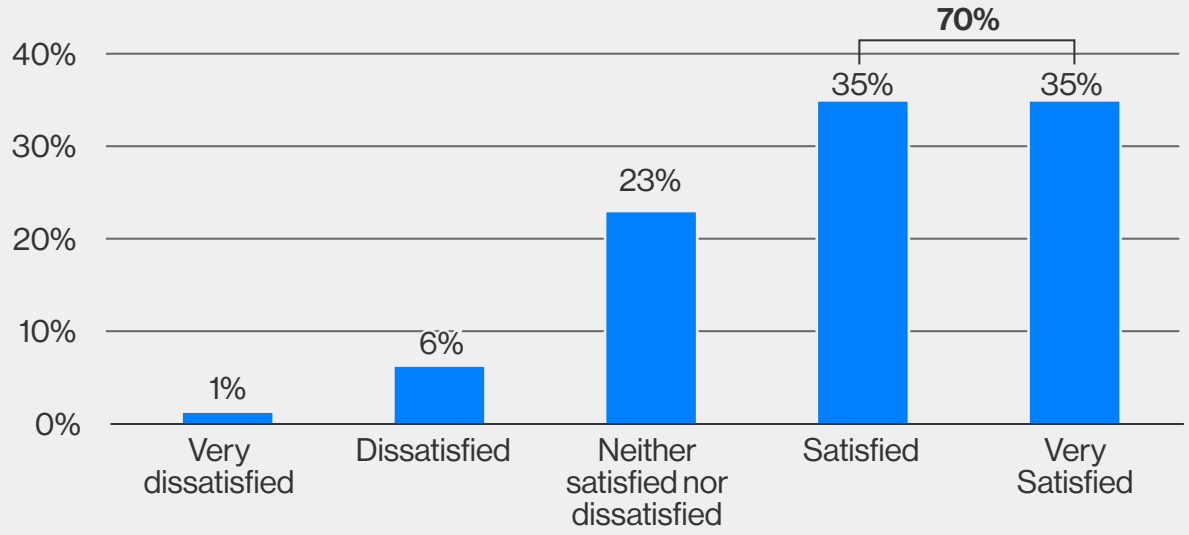
Source: Participant exit survey

While participants were optimistic about micro-credentials, during the interviews some reported that they did not share their micro-credentials with employers as they did not think employers would recognise their value or relevance to the job. This assertion was echoed by staff, employers, and college faculty who reported large variations in the level of understanding of micro-credentials among employers. This is in line with the state of micro-credentials in Canada: we do not have a common marketplace or benchmark for micro-credentials. Despite a standard assessment tool and cross-site quality assurance and calibration efforts, application of assessment criteria to determine skills-based micro-credentials still varies across and within institutions (consistent with validity challenges with more traditional grading and credential practices). This makes it difficult for learners and employers to know what skills and qualifications a micro-credential represents.

VALUE rubrics

Most participants were satisfied with the VALUE rubrics, which were used to assess learning outcomes in the 21st Century Skills micro-credentials (e.g., information literacy, lifelong learning). Seventy percent of respondents (80/114) reported they were very satisfied or satisfied with them (**Figure 12**).

Figure 12 | Satisfaction with VALUE rubrics (N=114)



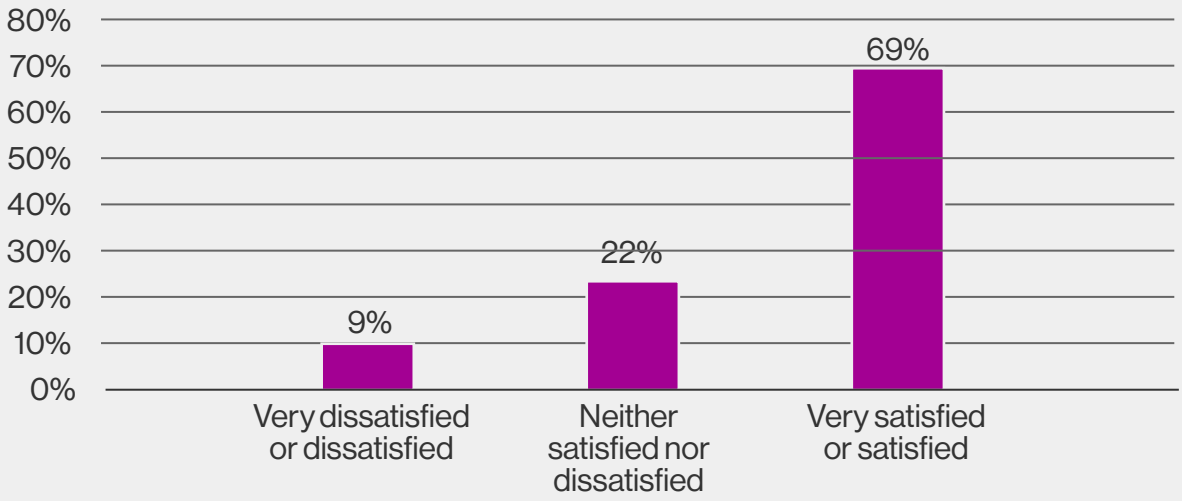
Source: Participant exit survey

However, some interview participants reported not understanding the VALUE rubrics, which was also shared by staff. Some participants had forgotten about them; this is unsurprising as the VALUE rubrics were just one component of MH4.0, and some participants may be more familiar with the skills than the assessment rubrics for them. Participants would have experienced a large number of components and features, many of which were more intensive than the VALUE rubrics (e.g., classes, work placements).

Work placements

Fifty-seven percent (80/140) of participants received a work placement. Among these participants, 69% (44/64) were satisfied or very satisfied with their placement experience (**Figure 13**).

Figure 13 | Satisfaction with work placements among participants who received one (N=64)



Source: Participant exit survey and administrative data

In interviews, participants talked about how MH4.0 work placements were useful for gaining Canadian experience, gaining practical experience, and having something to add to their resume.

However, in the interviews, some participants said they were asked to perform manual labour, which did not use their new skills. This may reflect the difficulty of offering substantive learning experiences in a two-to-three- week placement. It could also be that case that participants were not fully prepared for the day-to-day realities of working in material handling (which may involve manual labour in entry-level positions) or thought that MH4.0 would place them in management-level positions.

Most sites did not have enough work placements to provide one to every participant who wanted one. According to interviews with employers and staff, this was partially driven by employers not typically offering placements for only two weeks and perceiving this to be too short a period in which to effectively develop participants' skills. Another contributing factor was employers only having seasonal work opportunities that did not align with cohort timing. Despite the wage subsidies offered, employers were reluctant to offer placements due to the onboarding costs coupled with the short duration. Placement offerings were more available at Mohawk College due to strong pre-existing relationships with local employers in the sector, like at the Hamilton-Oshawa Port Authority.

5. Participant outcomes

This section investigates the outcomes achieved by participants in MH4.0. It compares data on employment, job satisfaction, and earnings from the baseline, exit, 3-month, and 9-month follow-up surveys. It also examines the role of the work placement in generating employment outcomes. Unfortunately, due to small sample sizes, we are not able to provide breakdowns of outcomes by partner college.

5.1. Employment

Employment outcomes over time

Employment outcomes for participants improve over time, suggesting that **MH4.0 may help participants secure employment.** Employment rates improved from baseline to exit, and from program exit to three months after exit. Employment rates at nine months after exit were similar to those at three months after exit (**Table 6**).

At program exit, participants were asked about their employment over the past seven days. For some participants, this may have reflected their work placement. This is not anticipated to have a major effect on employment rates since only 57% of participants completed a work placement and this proportion is even smaller among participants who completed the exit survey.

Table 6 | Changes in employment rates between time periods

Time period	% employed	% change from baseline
Baseline	**26%** (40/151)	
Exit	**53%** (51/97)	+27%
3-month	**68%** (51/75)	+42%
9-month	**64%** (43/67)	+38%

Source: Participant surveys

The sample used for **Table 6** above includes all individuals who responded at a given time point, including some participants who only completed a subset of the surveys. Narrowing the sample to include only participants who completed the baseline, exit, and 3-month surveys maintains a similar trend in employment rates (**Table 7**). Tracking these same respondents through the program shows that: 33% (18/54) were employed at baseline, 59% (32/54) were employed at exit, and 67% (36/54) were employed at three-months post-program.

Table 7 | Changes in employment rates between time periods (same participants)

Time period	% employed
Baseline	33% (18/54)
Exit	59% (32/54)
3-month	67% (36/54)

Source: Participant surveys

While small sample sizes do not allow for substantive breakdowns of employment rates by socio-demographic characteristics (or considering intersecting identities), we can make some preliminary observations on certain indicators (Table 8):

- **Gender:** At baseline, employment rates for men and women participants were similar, but three months after the program, 76% (32/42) of men were employed, and only 53% (16/30) of women were in work. This finding goes counter to the literature on the gender effects of skills training, which finds that women typically experience larger employment and earnings effects than men,[11,12] However, the goods movement sector is male-dominated (women make up 23% of the sector[13]), which may partly explain the finding (i.e., women may face barriers in the hiring process or be less attracted to male-dominated workplaces). There have also been gendered effects of the pandemic on the labour market, where women have experienced greater declines in workforce participation, partially due to increased unpaid care responsibilities; this could be an alternate explanation.[14]
- **Newcomers and BIPOC:** Participants born outside Canada and participants identifying as BIPOC have higher employment rates than those born in Canada (at baseline and follow-ups) and who do not identify as BIPOC.[15] Newcomers also have higher levels of education: in the sample, 57% of participants born outside Canada have a university degree compared to 13% of Canadian-born participants.

11 See Palamar, M., McKerrow, M., Myers, K., Plesca, M., Sierra Castillo, J., and van der Maas. M (2019) Skills Development and the Gender Wage Gap: An Analysis of Skills Training Programs in a Large Administrative Data Platform. Paper presented at APPAM Conference, Nov 9, Denver.

12 Card, D., Kluve, J., & Weber, A. (2018). "What Works? A Meta Analysis of Recent Active Labor Market Program Evaluations." Journal of the European Economic Association, 16(3), 894–931. Available at: https://doi.org/10.1093/jeea/jvx028

13 Lisson, L. (2021) On a mission to bring more women into the logistics industry, Canadian Council of business, April 8th. Available at: https://thebusinesscouncil.ca/publication/on-a-mission-to-bring-more-women-into-the-logistics-industry/

14 Scott, K. (2021). Women, work and COVID-19: Priorities for supporting women and the economy, Canada Centre for Policy Alternatives.

15 There is a considerable overlap between those born outside Canada and those identifying as BIPOC: 81% of people born outside Canada also identify as BIPOC.

Table 8 | Changes in employment rate between time periods (by socio-demographic groups)

Population group		% employed by time period			
		Baseline	Exit	3-month	9-month
Gender	Women	**25%** (13/53)	**49%** (17/35)	**53%** (16/30)	**46%** (12/26)
	Men	**28%** (26/94)	**55%** (33/60)	**76%** (32/42)	**75%** (30/40)
Age	Youth (under 35)	**33%** (21/63)	**53%** (18/34)	**65%** (20/31)	**70%** (14/20)
	Participants 35 and older	**22%** (19/88)	**53%** (33/63)	**70%** (31/44)	**62%** (29/47)
Born in Canada	Yes	**19%** (12/62)	**37%** (11/30)	**60%** (18/30)	**57%** (13/23)
	No	**31%** (28/89)	**60%** (40/67)	**73%** (33/45)	**68%** (30/44)
BIPOC status	BIPOC	**30%** (29/98)	**57%** (39/69)	**74%** (37/50)	**69%** (31/45)
	White/non-BIPOC	**23%** (10/44)	**48%** (11/23)	**57%** (12/21)	**56%** (9/16)

Source: Participant surveys

Employment outcomes by sector

Results suggest that participants were more likely to be employed in MH-related roles after the program compared to baseline (**Table 9**). However, as discussed in **Section 3.4** (Data Limitations), this finding should be interpreted with caution as our analysis was limited by the availability of appropriate employment sector data. Participant responses for employment sector are relatively incomplete and responses at program exit may have captured work placements rather than employment. This limits our ability to assess whether MH4.0 supports participants to find jobs in the target sector.

Table 9 | Participants with jobs related to material handling

Time period	% employed
Baseline	**19% (7/36)**
Exit	**48% (23/48)**
3-month	**41% (20/49)**
9-month	**36% (15/42)**

The role of work placements in employment outcomes

Work placements often lead to jobs as they allow participants to demonstrate their skills to employers over several weeks, rather than communicate them in a job interview, or on a resume. Employers can assess participants' skills and "fit" with their business over the course of the placement without committing to offering a permanent role. This allows employers to consider candidates they may not have otherwise .[16]

Based on this evidence, we investigated whether there was a positive relationship between work placement participation and post-program employment. Our analysis found that participants who completed a work placement had 3.5 times higher odds of employment at program exit (p=0.03). As shown in **Table 9**, work placements were the strongest predictor of employment status at exit[17] among other selected program components (counselling, one-on-one teaching and tutoring support, earning desired micro-credentials) and socio-demographics (gender, ethnicity). More information about interpreting this finding is available in **Box 5.**

Box 5 | Interpreting odds ratios

Table 10, below, presents the results of a logistic regression. This uses a set of participant characteristics as well as intermediate program outcomes to predict probability of employment at exit. The odds ratio represents **how many more times likely an individual is to be employed at exit if they have a given characteristic or experienced a given intermediate outcome, than if they do not.**

For example, the odds ratio of 3.5 for "work placement started" indicates that participants who started a work placement were 3.5 times as likely to be employed at exit than those who didn't start a work placement. The intercept represents the odds of employment at exit if they had none of the characteristics and had experienced none of the intermediate outcomes given below in the model.

Table 10 | Predictors of employment status at exit

	Predictor	Odds Ratio	p-value
	Intercept	0.99	0.99
Participant Characteristics	BIPOC	2.67	0.11
	Gender (Man)	0.46	0.22
Intermediate Outcomes	Work placement started	3.47	0.03
	Accessed counselling service during program	0.86	0.80
	Earned desired credentials or certificates during program	0.71	0.72
	Accessed one-on-one teaching/tutoring supports during program	0.53	0.24

Source: Participant surveys and administrative data

16 Ratledge, A., Miller, C., Schaberg, C. (2023) Sector Strategies for Workforce Development: A Synthesis of the Research for Employers and Local Governments, MRDC.

17 As noted above, employment status at program exit may have captured work placements for some participants.

This finding is consistent with the wider literature on sector-based models, which specifies the work placement as a key contributor to employment outcomes.[18] Other projects in the FSC Scaling Portfolio have identified work placements as an important mechanism for helping participants find work.[19]

5.2 Job satisfaction

Job satisfaction over time

Participants' job satisfaction increases over time. The percentage of respondents who were employed and either agreed or strongly agreed that they were satisfied with their job rises from baseline onwards. **Table 11**, below, shows how job satisfaction increased over time. Overall, 64% (32/50) of participants were satisfied with their jobs at program exit. Satisfaction was higher among those not employed at baseline, with 72% (23/32) of newly employed participants agreeing or strongly agreeing that they were satisfied with their job.

Table 11 | Job satisfaction

Time period	% satisfied
Baseline	47% (18/38)
Exit	64% (32/50)
3-month	74% (37/50)
9-month	81% (35/43)

Source: Participant surveys
*Percentage of survey respondents who agreed or strongly agreed that were satisfied with their job.

Table 12, below, shows the change in job type from baseline onwards. It shows that the percentage of employed participants increased from 26% at baseline, to 53% at exit, and 68% at three months post-program, dipping slightly to 64% at nine months post-program. It also shows that the percentage of participants employed in casual, seasonal, or temporary jobs fell from a high of 58% at exit to 40% at nine-months post-program.

Table 12 | Employment in casual, seasonal or temporary jobs

Employment outcome	Baseline (N=152)	Exit (N=125)	3-month (N=75)	9-month (N=68)
Employed	**26%** (40/151)	**53%** (51/97)	**68%** (51/75)	**64%** (43/67)
Job is casual	**44%** (14/32)	**40%** (20/50)	**26%** (10/38)	**37%** (11/30)
Job is seasonal	**21%** (8/38)	**24%** (12/50)	**18%** (9/51)	**5%** (2/43)
Job is temporary	**34%** (11/32)	**42%** (21/50)	**24%** (9/38)	**13%** (4/30)
Job is casual, seasonal, or temporary	**56%** (18/32)	**58%** (29/50)	**45%** (17/38)	**40%** (12/30)

Source: Participant surveys

18 Ratledge, A., Miller, C., Schaberg, C. (2023) Sector Strategies for Workforce Development: A Synthesis of the Research for Employers and Local Governments, MRDC.

19 Work placements were identified as an important mechanism for helping participants to find work in EDGE UP and Aspire Atlantic.

5.3 Earnings

Earnings over time

Employed participants were asked about their employment earnings in all four surveys (baseline, exit, 3-month follow-up, 9-month follow-up). **Table 13** shows respondents' average weekly earnings.[20] **We see a steady increase in average weekly earnings over time**, however, small sample sizes mean that these results should be interpreted as preliminary.

However, piecing together the data on job satisfaction, job type, and earnings, we can start to construct a tentative picture of how MH4.0 benefits participants. Job satisfaction increases from baseline onwards. This rise could be caused by a shift towards permanent jobs and higher earnings.

The program appears to help participants move away from casual, seasonal, and temporary jobs, which may result in increases in average weekly earnings. Given the shift towards permanent jobs, these earnings gains are likely driven by an increase in the number of hours worked, although it is possible that hourly wages may have increased to some extent. More data and research are needed to fully understand the extent to which wage increases and hours worked contribute to rises in average weekly earnings. But, as stated above, the sample size restricts the certainty with which we can draw conclusions from the data, so these assertions should be seen as provisional.

Table 13 | Average weekly earnings

	Baseline (N=152)	Exit (N=125)	3-month survey (N=75)	9-month survey (N=68)
Employed	26% (40/151)	53% (51/97)	68% (51/75)	64% (43/67)
Average weekly earnings*	$464.78 (n=30)	$602.61 (n=47)	$672.98 (n=37)	$723.39 (n=29)

Source: Participant surveys

*Hourly wages were converted into weekly earnings based on the number of hours worked per week reported by each respondent. Weekly, biweekly, monthly, semimonthly, and annual earnings were converted into weekly earnings. Most respondents reported hourly wages at all timepoints.

20 We did not conduct a longitudinal analysis of earnings as diminishing response rates over time lead to small sample sizes.

6. Concluding thoughts

6.1 Summary of findings

Overall, partner colleges delivered the core parts of the MH4.0 (along with site-specific supports) and reached their target populations and recruitment targets. They were able to do this on short timelines, which is notable given that sector-based models are often challenging to implement and can take many months to deliver the full program model, even for high-capacity providers. Partners were also able to implement MH4.0 during the height of the COVID-19 pandemic and still reach their recruitment targets and target populations. This was unlike similar projects, including those in the FSC Scaling Portfolio, which faced major recruitment and delivery issues due to the pandemic and its impacts on the labour market.

Participants were generally satisfied with MH4.0. Satisfaction rates were consistent across three of the four sites, which suggests that MH4.0 is being implemented with similar levels of quality across these sites. Lower satisfaction rates at Nova Scotia Community College may be related to program recruitment channels. Among program components, satisfaction rates were highest for program staff and lowest for work placements – though almost all components had lower satisfaction rates than the overall program. Further investigation is needed to understand site-specific factors contributing to satisfaction and factors driving discrepancies between satisfaction with the program itself and satisfaction with its components.

Employment rates for MH4.0 participants improve over time, with significant increases from baseline onwards. Although data quality limits our ability to assess the extent to which participants find jobs in the goods movement sector, the results suggest that those who complete the program may obtain jobs that are more satisfying, less likely to be causal, seasonal, or temporary, and may allow them to earn more.

6.2 Continuous improvement

Based on our findings and broader knowledge of sector-based models, we suggest some opportunities for improvement in how MH4.0 is designed and delivered

- **Target participants and recruitment channels:** MH4.0 broadly reached its target groups across the four sites. However, the first cohort at Nova Scotia Community College was recruited through its Women Unlimited program for women in trades. This group had higher baseline employment than participants at other colleges and had initially signed up for very hands-on trades programming before being recruited into MH4.0. Given the lower satisfaction rates at this site, it is possible that MH4.0 was misaligned with their needs and expectations. This flags an opportunity to think through and refine the core target groups for the program and how they are recruited into the program.
- **Satisfaction with program components:** Satisfaction with all but one program component (course instructors) was lower than overall program satisfaction. Participants were least satisfied with VALUE rubrics and work placements, while satisfaction rates were highest for participants' experiences with program staff, including course instructors, Job Developers, and Learning Support Officers. These

differences are useful in targeting program improvements, yet more investigation is needed to unpack satisfaction ratings for program components. Lower satisfaction with some program components is not entirely surprising, given that MH4.0 is a new program and that sector-based models take time to refine and optimize across different sites. It is difficult to build a program that both develops the skills employers value and is achievable for target groups who face barriers to learning. Clear feedback from participants and staff is a critical input into refining and optimizing the program components and course content.

- **Micro-credentials:** Participants and employers had some uncertainty about the value of micro-credentials. This is not unique to MH4.0. The past decade has seen rapid growth in the number of micro-credentials available to learners, yet the marketplace for these new credentials is often opaque, fragmented, and hard to navigate . Canada does not have a common foundation for education and training against which to benchmark micro-credentials (i.e., to allow learners and employers to quickly assess any given micro-credential against a common national benchmark). Even within MH4.0, site assessors may have had different interpretations of the standard micro-credential assessments. This means that it can be hard for learners and employers to know what skills and standards a credential represents and what it qualifies the holder to do. Going forward, it is important that delivery organizations work closely with employers to clearly articulate the skills and degree of competency that micro-credentials represent and how they align with employer needs. It is also critical that delivery organizations teach participants what their credentials mean and how to articulate them accurately and with confidence.
- **Work placements:** There was a shortage of work placements at the partner colleges, which resulted in not all participants who wanted a work placement receiving one. As work placements are an important mechanism for achieving employment outcomes, increasing access to placements should be a priority. A related area of exploration on work placements is to determine what length of placement works best for both participants and employers.

6.3 Wider learnings

Overall, MH4.0 provides six key lessons on the design and scale of a sector-based model:

1. **Include a research phase:** The research carried out by Mohawk College, the Ontario Centre for Workforce Innovation, and Hamilton-Oshawa Port Authority created a solid foundation for MH4.0 by identifying labour demand and skills needs at the port. This helped Mohawk College choose a target industry and select training content and certifications that were relevant to employers.
2. **Select partners carefully:** Mohawk College carried out research on local labour markets to identify goods movement hubs and suitable partner colleges located nearby. This enabled Mohawk College to scale MH4.0 in locations in which it had a good chance of success, where participants would find work in the local goods movement sector and partner colleges would be able to implement the core components of the model.
3. **Ensure flexibility:** MH4.0 struck a balance between maintaining a stable, codified, core model and allowing partner colleges to offer additional, non-core, support services. This flexibility meant that partner colleges were able to tailor the model to respond to local needs, which proved important as the four sites served different learner bases.

4. **Build on existing industry-recognised training content and certifications:** MH4.0 builds on existing training content and certifications developed by the American Association of Colleges and Universities (i.e., VALUE rubrics), the Manufacturing Skills Council (i.e., training content), and the Manufacturing Skill Standards Council's Certified Logistics Associate (i.e., industry certifications). By leveraging existing content and qualifications, Mohawk College ensured that training and certifications were relevant to employer needs, and that employers would recognise and value them.
5. **Ensure employers and participants understand and value micro-credentials:** Mohawk College used the VALUE rubrics, a well-established and widely recognised framework, as a basis for their new micro-credentials. But the lack of understanding of the credentials among both employers and participants points to a need for stronger engagement to generate buy-in from employers and better explanation to participants to boost their confidence in their new qualifications. There is also a related need to strike the right balance between site independence to award micro-credentials and cross-site consistency to promote a common standard of competency. Calibration and quality assurance practices can be helpful, but ultimately site assessors may have different interpretations of assessment criteria.
6. **Offer work placements:** Most participants who completed a work placement were satisfied with it and participants noted that work placements were important for gaining practical and Canadian experience. Further, participants who completed a work placement were significantly more likely to be employed at program exit. This is consistent with the literature on sector-based models and findings from other projects in the FSC Scaling Portfolio, which demonstrate that work placements are key contributors to employment outcomes.

With the MH4.0 model and Four College Alliance, Mohawk College has developed a sector-based model and a platform for scaling it beyond Hamilton with some success. The process Mohawk College used to design and scale MH4.0 offers several important lessons. By generating and sharing these lessons, Mohawk College and partners are making a significant contribution to the goal of enabling and empowering other colleges, service providers, and training organizations to develop their own sector-based models in response to different and diverse labour market needs.

Appendix A
Common Outcomes Framework

	Outcome	Indicators
Socio-demographics	Sex & Gender	Sex at birth
		Self-identified gender
	Age	Age
	Location	Province
		Region & Municipality
	Marital status	Marital status
	Children & Dependents	Children
		Dependents
		Household size
	Household Income	Household income
	Education	Highest credential obtained
		Location of highest credential attainment
	Indigenous Identity	Self-identified Indigenous identity
	Francophone status & languages spoken	First language spoken
		Official languages
		Language spoken at home
		Other languages spoken (At home)
	Citizenship Status	Place of birth
		Year of arrival
		Citizenship status
	Racial identity	Self-identification as member of racialized group
	Disability	Self-identified disability
Employment status and history	Employment	Employment status
		Nature of employment (permanent, temporary, full/part-time)
	Earnings	Hours worked / week
		Wages
		Annual earnings
	Industry and occupation of employment	NAICS code of job
		NOC code of job
	Work history	Time since last employed
		NOC code of job
		NAICS code of job
	Income source	Income sources

	Outcome	Indicators
Intermediate outcomes	Program completion	Successful completion of planned activities
	Participant satisfaction	Satisfaction with program
		Perceived Utility of Program
		Likelihood to recommend
Customized intermediate outcomes	Skills gains	Measured gains in specific skills
	Program-specific credential attainment	Attainment of program-specific credentials
Long-term outcomes	Employment and retention	Employment status
		Nature of employment (permanent, temporary, full/ part-time)
		Retention
	Earnings	Hours worked / week
		Wages
		Annual earnings
	Benefits	Presence of benefits including: Paid leave, Health and dental coverage, Pension plan
	Industry and occupation of employment	NAICS code of job
		NOC code of job
	Job Satisfaction	Satisfaction with job
		Perceived opportunity for career advancement
		Perceived job security
	Enrolment in further education	Enrolment in further education
		Type of training
		Field of study
	Credential attainment	Attainment of high school or PSE credentials
		Field of study credentials

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