

Wallets, Passports, Portfolios, Credentials:

What Learners Want in a Virtual Education Wallet

March 2023



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Executive Summary

This report, published by eCampusOntario (Ontario Online Learning Consortium), was funded by the Ontario Ministry of Colleges and Universities as part of the Micro-credential strategy. eCampusOntario was asked to conduct consultations to analyze perceptions among learners from Ontario's Indigenous Institutes, colleges, and universities about digital credentialing and virtual wallets. By reporting on learner perceptions of digital credentials and virtual wallets, eCampusOntario is able to present the Ontario postsecondary education sector with prospective uses, design features, and requirements for a digital credential wallet learners will want to use.

This report is informed by the collective results of research activities performed by eCampusOntario from September to November 2022. The project consisted of an online survey and virtual focus group sessions, which involved outreach to learners who completed the requirements of a micro-credential offered at a publicly-assisted Ontario Indigenous Institute, college, or university. For the online survey, learners were reached through mass emails targeted to users of eCampusOntario's badge passport and targeted digital advertisements. As part of the online survey, learners were offered the opportunity to participate in an hour-long virtual focus group.

The Digital Credentials and Virtual Wallets online survey was open from September 19 through October 31, 2022. There were 752 total respondents, 446 (59%) of whom qualified as learners who had completed the requirement of a micro-credential and thus eligible to complete the remainder of the survey. Qualifying learners were invited to participate in virtual focus groups for compensation, held in October and November of 2022. The focus groups included 41 participants, which was 9% of qualifying learners.

The purpose of these undertakings was to directly converse with learners to: understand learner motivations for taking micro-credentials, understand learner motivations for displaying and sharing a digital credential, understand learner interactions and experiences with digital wallet systems, and identify what learners consider important features of a digital credential wallet. This data will provide insight as the sector develops a wallet system.

Thematic areas addressed by the survey:

- Current purposes of virtual wallets generally and virtual wallets specifically for education credentials
- How use of a virtual wallet could help reskill and upskill learners, gain employment or track professional development
- Understanding learner perceptions of security for a virtual wallet
- Understanding learner accessibility requirements and desired features of a virtual wallet
- Demographic data

Thematic areas addressed by focus groups:

- The need for and use of a virtual education wallet
- How a virtual wallet could be used specifically for employment circumstances
- Security features and ownership of credentials held in a virtual wallet
- Cost associated with the use of a virtual wallet
- Name for a virtual wallet
- Desired features for a virtual wallet

The complete set of questions for the survey can be found in *Appendix A*. Focus group questions can be found in *Appendix B*. Ontario postsecondary institutions should feel free to use these questions if they seek to replicate or validate our findings at their institutions.

Key Findings

Learners in Ontario overwhelmingly indicated that they are interested in and are open to using a virtual wallet for their micro-credentials, as well as for other digital educational credentials. However, learners expressed concern over how this wallet system would function, the security of their credentials in a wallet, and the universality of the wallet. This research provided Ontario micro-credential learners with a forum to express what features they desire in a virtual wallet, how they would use a virtual wallet, and how they currently use virtual wallets.

Other key findings that emerged from the data collected includes:

- Employability and obtaining future education are the main reasons why learners would want a virtual wallet for their educational credentials. 347 of 387 respondents (90%) overwhelmingly indicated they took a micro-credential for the purpose of gaining employment, upgrading their skills for work, or entry into further education. 242 of 347 respondents (70%) believed that displaying their micro-credential in an employment related circumstance had a favorable employment outcome
- Learners do not like the name “wallet” or “passport” for an application or repository to store their educational credentials
- Learners would prefer that their educational wallet be stored in an existing virtual wallet such as Apple Wallet or Google Pay
- Learners are concerned about how employers recognize micro-credentials and digital credentials
- Learners are concerned about how their data is protected, and how to share wallet data with others, such as potential employers
- Learners prefer a central repository to hold all their credentials
- Learners would like to have the ability to choose which credentials they can display to potential employers
- Learners expect a digital wallet service to be free of cost and user friendly

Findings of this research indicate that those learners surveyed want a virtual wallet to store their digital credentials. However, consultations with employers will help to gauge how employers recognize digital credentials and if they want to verify credentials of potential employees. Employer engagement is needed to ascertain receptivity to digital credentials, micro-credentials, and the use of virtual wallets in addition or supplemental to C.V’s and résumés. Learners need to be engaged in the design and implementation of virtual wallet systems.

Acknowledgments

First and foremost, eCampusOntario would like to thank all micro-credential learners who participated in our survey and focus groups: thank you for helping to inform the Ontario postsecondary education sector. We would also like to thank our funders at the Ontario Ministry of Colleges and Universities. At eCampusOntario, thanks are owed to the Communications Team, especially Jason Northway-Frank and Paol Wierzbicki; Rich Loutett; Alissa Bigelow; the Project Management Office; and Senior Leadership. On the Research and Foresight Team, thanks are offered to Graeme Cannon, Laura Viselli, Elisa Arnold, Rocío Chávez-Tellería, Monica Shah, and our many foresight assistants for their enthusiasm and support over the course of this project.

Introduction

In 2011, the American open-source technology non-profit Mozilla Foundation announced a plan to create an open standard “Open Badge” to create a system to issue, collect, and share digital badges.¹ The Mozilla Open Badges were initially used for educational-adjacent activities, like SCUBA certification, but were also adapted by industry and the higher education sector. Companies such as Adobe, Dyson, Google, Microsoft, and IBM created badges for customers to display proficiency in their products, but also to gamify internal professional development offerings and to identify emerging talent within their companies.² Initially, the higher education sector issued digital badges created on the Mozilla platform for the completion of workshops, seminars, and conferences, but eventually issued digital badges as certifications of completing traditional academic accomplishments. Open Badges allowed learners to display and share earned competencies, skills, and awards with peers and employers alike.

The Open Badge has evolved into a variety of digital credentials, ranging from diplomas and certificates to awards and credentials, issued by educational institutions worldwide. Most commonly, badged learning has been associated with micro-credential learning. eCampusOntario’s *Micro-credential Toolkit* defines a micro-credential as “shorter learning experiences that home in on a specific topic or identified skill gap in ways that are flexible and readily accessible for learners, designed to focus on a specific skill, subject, or topic, are credit-bearing or non-credit-bearing, are industry focused with assessments to support

learners with retraining, upskilling, or pursuing a career change, and are developed and designed with industry experts to ensure that retraining and upskilling accurately reflect industry needs and are recognized with some form of certificate or digital badge outlining the learning outcomes or competencies that learners achieved.”³ Micro-credentials typically require less time to complete (compared to certificates, diplomas, degrees, or post-graduate certificates), require evidence of achievement of outcomes, are often endorsed by industry partners and external bodies, may be compatible with traditional transcripts, and recognize performance competencies explicitly aligned to underlying knowledge, attitudes, and skills. In Ontario, some micro-credentials may be verified and shared digitally (e.g., through digital badges), and may be tailored to specific employer needs.⁴ Digital badges with embedded metadata can verify that a learner has completed a course, display learning outcomes, link to associated projects and course work, contain industry endorsements, and display grades or feedback about the learner’s work.

Learner demands and attitudes towards digital credentials have rapidly evolved since Mozilla Open Badges, especially following the rapid emergency digital transformation of the postsecondary education sector in Ontario starting in March 2020 during the COVID-19 pandemic. Following the public health and travel restrictions of the pandemic, alternative modes of educational delivery, namely emergency-remote teaching and learning, were enacted at most Ontario Indigenous Institutes, colleges, and universities. As a result, the number of

1 Surman, Mark. “Mozilla Launches Open Badges Project.” *Mozilla Blog*, September 15, 2011. <https://blog.mozilla.org/en/mozilla/openbadges/>

2 Lowendahl, Jan-Martin. “Microcredentials Promote Continuous Learning and Build an Agile Workforce.” *Gartner*, 2020.

3 Bigelow, A et. al. *eCampusOntario’s Micro-credential Toolkit*. eCampusOntario OpenLibrary, June 2022.

4 For example, the Ontario Extend Empowered Educator micro-credential, offered by eCampusOntario, can be credited towards learning at Conestoga College. eCampusOntario, “Micro-credential Principals and Framework.” 2020. https://micro.ecampusontario.ca/wp-content/uploads/2020/12/Micro-credentials-en_v2.pdf

new entrant international students enrolled to study outside Canada through the internet quadrupled from 1,323 in 2019/2020 to 5,439 in 2020/2021.⁵ With both domestic and international learners completing classes online, institutions identified a need to verify educational credentials. This demand was believed to be one of the largest hurdles from this shift in educational delivery.⁶

The data collected in this report reveals Ontario micro-credential learner perceptions of digital credentials and virtual wallets to store digital education credentials. This data is of utmost importance as the sector designs and implements a virtual wallet system with learner perspectives in mind. The voice of the learner is central to the digital transformation of Ontario's postsecondary sector.

Inclusion Criteria

eCampusOntario surveyed 752 total respondents, 446 of whom qualified as learners who have completed the requirements of a micro-credential offered by (or in conjunction with) a publicly-assisted Ontario Indigenous Institute, college, or university. Learners who completed the requirements of a micro-credential were selected as qualifying for the survey as they already completed a micro-credential and may have received a digital credential, unlike current micro-credential learners and non-micro-credential learners. Of the 446 qualifying micro-credential learners, 41 participated in focus group discussions.

The survey and focus groups revealed the demographics of micro-credential learners (including age, learner path, and career field), how learners currently interact with and think of existing digital

By turning to learners, we can gauge if and how they want to share digital credentials, with whom they want to share educational credentials, and how they foresee sharing and holding digital credentials.

In 2022, the Ontario Ministry of Colleges and Universities asked eCampusOntario to conduct consultations with learners on their perceptions of a "virtual passport" for digital credentials. Research revealed that learners strongly dislike the name "virtual passport," so the term digital wallet for micro-credentials was used to conduct consultations with learners.⁷ Results from survey and focus group consultations with Ontario micro-credential learners are presented; these were conducted from September to November 2022.

wallets, how they foresee using a virtual wallet for digital credentials, the features learners expect in a virtual education wallet, how learners perceive security and ownership of credentials in a virtual wallet, required accessibility features, and why some learners do not approve of a virtual wallet for their education credentials. These discoveries, which comprise the different sections of this report, can be used to inform decision making processes as the sector develops a virtual wallet for educational credentials. Virtual wallets for educational credentials have the ability to help learners find better ways to demonstrate their capabilities for career growth and connect their skill sets directly with employers.

5 Statistics Canada, "Canadian postsecondary enrolments and graduates, 2020/2021" *The Daily*. November 22, 2022. <https://www150.statcan.gc.ca/n1/en/daily-quotidien/221122/dq221122e-eng.pdf?st=imHV2pjj>

6 Duklas, Joanne. "Micro-credentials: Trends in Credit Transfer and Credentialing." BC Council on Admissions & Transfer, 2020.

7 eCampusOntario's Research and Foresight Team determines that the word "passport" became heavily politicized in Ontario during the COVID-19 pandemic, in relation to the "vaccine passport." Terms including wallet, portfolio, transcript, and vault have been used internationally to describe a repository for digital educational credentials. The term "wallet" was used by the research team to describe a digital repository for educational credentials to avoid using the term passport, and because many Ontario learners were perceived to be users of non-educational digital wallets such as Apple Wallet and Google Pay. Further discussion on learner perspectives of names for an education wallet can be found in the "Current Wallet Use" section of this report.

Literature Review

Within the practice of micro-credentials, there are many debates over the definition, function, technological applications, and purpose behind micro-credential learning and digital credential systems. A study conducted by Rory McGreal and Don Olcott suggests that the definition of micro-credentials is hard to define because so many professional organizations and governing bodies play a role in ensuring that their micro-credential offerings are recognized as traditional credit earning.⁸ For example, eCampusOntario's *Micro-credential Toolkit* uses a set of flexible characteristics that define what a micro-credential is and is not, in addition to the definition of a micro-credential.⁹ The Ontario Student Assistance Program (OSAP) defines micro-credentials as a credential that "take[s] less time to complete than degrees or diplomas, may be completed online and may include on-the-job training, and are often created with input from business sectors, so the skills being taught match employer needs."¹⁰ A study of micro-credentials in the United States suggests that micro-credentials are an "education currency" and digital badges are the "assessed artifacts" to demonstrate skill.¹¹ While many organizations and academics disagree on a singular definition for micro-credentials, several have called for the creation of digital repositories for learners to hold verifiable digital credentials.

The demand for micro-credential learning emerged in industry as a way to track employee internal learning, the motivation of employees to grow in their careers, career progress, and professional development.¹² Micro-credentials also emerged as a way for industry to identify skills-based training and a mastery of competencies during employee onboarding and recruitment.¹³ Micro-credentials in Canada, the United States, Australia, and New Zealand have been commonly associated with lifelong learning, re-skilling, and upgrading skills. They are commonly recognized through digital badges and embedded with sharable metadata outlining the skills and achievements acquired by the learner in the process of completing specific learning outcomes and acquiring particular skills or knowledge. Some scholars suggest that micro-credentials are the most recent iteration of occupationally-focused short training programs that are growing in recognition by institutions, employers, and interest groups.¹⁴ However, a 2022 report from Statistics Canada challenges this notion and suggests that following a permanent job loss, learners who graduate from a short non-STEM micro-credential experienced no relative earnings gains.¹⁵

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- 8 McGreal, R. & Olcott, D. "A strategic reset: micro-credentials for higher education leaders." *Smart Learning Environments*, 9.(9), 2022, 1-23.
- 9 Bigelow, A et. al. *eCampusOntario's Micro-credential Toolkit*. eCampusOntario OpenLibrary, June 2022.
- 10 Ontario Ministry of Colleges and Universities, "Micro-credentials from Ontario's postsecondary schools." May 12, 2022. <https://www.ontario.ca/page/micro-credentials-ontarios-postsecondary-schools>
- 11 Lowendahl, Jan-Martin. "A Simpler Higher Education 'Business Opportunity' Framework for Continuous Learning." Gartner, 2021.
- 12 Extreme Marketing Blog. "How We Use Digital Badges for Recognition and Motivation at Extreme Networks." May 5, 2021. <https://www.extremenetworks.com/extreme-networks-blog/how-we-use-digital-badges-for-recognition-and-motivation-at-extreme-networks/>
- 13 Hunt, T., Carter, R., Yang, S., Zhang, L., & Williams, M. "Navigating the Use of Microcredentials." *Journal of Special Education Technology*, 37.(1), 2021. 3-10. 10.1177/0162643420933568
- 14 Kirby, D. "Current Trends and Recurrent Themes in Canadian Higher Education." *International Journal of Technology and Inclusive Education*, 10.(1), 2021, 1648-1653.
- 15 In contrast to graduates of micro-credentials, individuals who graduated from a college or CEGEP certificate or diploma program, followed by learners who completed independent credits, after job loss registered substantially larger percentage increases in annual earnings. Frenette, Marc and Tomasz Handler. "Does taking short postsecondary programs or independent credits benefit recently displaced workers?" Statistics Canada, November 23, 2022. <https://doi.org/10.25318/36280001202201100003-eng>

The rise of micro-credentials offered by publicly-assisted postsecondary education institutions aligned with the rise of the shadow education sector, an ecosystem of non-traditional, non-accredited education providers, that also offer micro-credentials and other short training programs.¹⁶ Public institutions needed a way to verify micro-credentials and recognize where they were earned in order to recognize micro-credentials towards traditional credited learning. While the issuing of digital badges alongside micro-credentials addressed this problem, learners were unable to track and store their digital badges from multiple institutions. Most of the work on digital wallets, passports, backpacks, and portfolios for digital credentials have been regionally led and implemented. For example, the Digital Credentials Consortium (DCC), created and led by universities with expertise in verifiable digital credentials design, aims “to create a trusted, distributed, and shared infrastructure that becomes the standard for issuing, storing, displaying, and verifying digital academic credentials.”¹⁷ Although this specific program is a platform to verify tertiary academic credentials such as micro-credentials, the DCC’s founders acknowledge that it is best seen as part of a larger system that ties together postsecondary and life-long learning.¹⁸

The DCC led the development of the open-source Learner Credential Wallet and the WebVerifier+. In the United Kingdom, the Open University Knowledge Media Institute stores badges earned from the Open Learn website and MOOCs on an

Ethereum-based blockchain system.¹⁹ In Ontario, eCampusOntario created the eCampusOntario Open Badge Passport, which allowed learners to import any online badges to a virtual wallet system. Other initiatives in Canada, such as MyCreds/MesCertif which was launched by the Association of Registrars and Universities and Colleges of Canada (ARUCC) in 2020, powered by Digitary, eases processes associated with issuing and receiving verified digital documents and connects Canadian member institutions with institutions on the My eQuals (Australia/New Zealand), CollegeNet (USA), CSSD (China), Ireland HE, and Digitary (Europe) systems.²⁰ MyCreds currently lists 19 publicly-assisted Ontario colleges and universities, the Ontario Universities Application Centre (Law, Medical School, Rehabilitation Sciences), and the Ontario College of Teachers as members.²¹ As a variety of virtual wallet systems are being created globally, learner perceptions of virtual wallet systems should be collected to inform Ontario’s sector about learner needs and demands of a virtual wallet system.

There is also a gap in the Canadian, specifically Ontario-centric, research on micro-credential learner perceptions and digital credential wallet systems. A 2021 study conducted at the University of Waterloo sought to gauge the perceptions of co-op employers and learners on micro-credentials for work-integrated learning. The study suggested further research is required regarding the value learners and employers assign to micro-credentials.²² Another Ontario-centric study occurred in 2021 as McMaster University conducted a study involving ten learners in the Faculty of Engineering and their experiences with

16 Thayer, Terri-Lynn. “Higher Education Ecosystem 2030: Planning in the Face of Radical Uncertainty.” *Gartner*, 2021.

17 Moldovenanu, M., Frey, K., & Mortiz, B. “4 Ways to Bridge the Global Skills Gap.” *Harvard Business Review*. March 18, 2022. <https://hbr.org/2022/03/4-ways-to-bridge-the-global-skills-gap>

18 The University of Toronto and McMaster University, both eCampusOntario members, are also founding members of the DCC. McMaster piloted a decentralized virtual wallet with verifiable credentials on the blockchain for diplomas and letters of enrollment in 2021. Ibid.

19 Jirgensons, M., & Kapenieks, J. “Blockchain and the Future of Digital Learning Credential Assessment and Management.” *Journal of Teacher Education for Sustainability*, 2018, 20(1), 145–156. <https://doi.org/10.2478/jtes-2018-0009>

20 Digitary, “Projects.” <https://www.digitary.net/projects/> (Accessed November 28, 2022).

21 MyCreds, “Member Director.” <https://mycreds.ca/members/member-directory/> (Accessed November 28, 2022).

22 Ashcroft, K et. al. “Microcredentials and work-integrated learning,” *International Journal of Work-Integrated Learning*, 22.(3), 2021, 423-432, 430.

the McMaster decentralized verifiable credential system.²³ These limited studies of small groups of learners at two Ontario institutions suggest the need for a wider Ontario study of diverse learner groups at multiple institutions. An American study on learner perceptions of micro-credentials and digital badges revealed that 46% of participants believed

that digital badging is not yet widely recognized, and 34% of participants did not fully understand the concept.²⁴ As such, it is clear that this research on learner perceptions of virtual wallets for digital credentialing will be important for the Ontario postsecondary sector as it develops a credential wallet system.

Methods

All project activities from conceptualization, literature review, survey development, participant recruitment, data collection, focus groups, analysis, and dissemination of research took place between June 2022 and March 2023. A survey and focus group discussions were conducted between September and November of 2022. Research participants were recruited through several methods, recognizing that micro-credential learners are at a variety of stages in their education and work lives, ranging from traditional track students to mid-career re-skilling to late career professionals. Participants were invited to participate via targeted Google and Facebook advertisements, eCampusOntario's social media feeds, emails sent to users of eCampusOntario's Open Badge Passport, and emails to eCampusOntario's Micro-credential Community of Practice and BC Diploma Administrators.

A survey of up to thirty-four questions, was created and hosted on the web based Qualtrics platform. Some questions were revealed based on how respondents answered previous questions, such as a series of questions for learners who currently use virtual wallets. As not all respondents were invited to answer all questions, the number of respondents to specific questions varies and has been indicated throughout this report. The data also includes the responses of survey respondents who did not complete the entire survey, so the number of respondents per question also reflects these discrepancies. The survey contained quantitative

questions (e.g., five-point Likert scales, multiple choice, select your favorite option, yes or no), and qualitative questions (e.g., long answer text responses). Questions in the survey were grouped thematically: Demographics, Current Virtual Wallet Use, Needs in a Future Education Wallet, Accessibility, and Security/Ownership of Credentials. Survey participants had the opportunity to enter a raffle to win a \$50 gift card. The survey was opened on September 19, 2022, and closed on October 31, 2022.

At the end of the survey, participants were offered the opportunity to participate in an hour-long focus group, with \$100 offered as compensation for their participation. 216 participants indicated interest in participating in focus groups, and two emails were sent to this group inviting them to participate. Of the 216 invited, 41 participants attended an hour-long focus group session. Seven sessions were held to accommodate all participants. These 41 focus group participants represent 9% of all qualifying learners who took the survey. Focus groups sought clarification on trends identified in the survey and qualitative responses. The research team identified that some focus group participants were postsecondary administrators, faculty, and instructors; these individuals were asked to answer all questions from the perspective of a learner, rather than informed by their respective positions. Focus groups were conducted between October 6, 2022, and November 7, 2022.

23 Sheardown, Heather. *Exploring the Applicability of Verifiable Credentials and Decentralized Identifiers in the Ontario Postsecondary Education Sector*. McMaster University, 2021.

24 Chakroun, B., and Kevvy, J. "Digital Credentialing: Implications for the Recognition of Learning Across Borders." UNESCO, 2018.

The research team conducted data analysis in November 2022. Qualitative responses were populated and coded in the NVivo qualitative analysis software to identify trends and patterns amongst

long answer questions in the survey and focus group responses. Quantitative analysis was performed in Excel and in the Qualtrics platform. This data analysis informed the production of this report.

Limitations

eCampusOntario's position as a consortium of postsecondary institutions allowed us to access learners at a variety of institutions across Ontario. While this allowed us to have a wide reach of our survey, we relied on the use of paid advertisements on Google and Meta (Facebook and Instagram) platforms to recruit research participants. We recognize that this approach is shaped by the digital divide and limited our recruitment to users of Google and Meta services. Other learners were recruited as users of eCampusOntario's Open Badge Passport. The Open Badge Passport is open to all learners who have collected digital education badges, not necessarily just those offered by a publicly-assisted Ontario Indigenous Institute, college, or university. The service has over 16,000 registered users, with many users from Seneca College and Conestoga College specifically. By recruiting from the Open Badge Passport, we recognize that we have a disproportionate number of survey participants from Seneca and Conestoga Colleges.

Another limitation was the composition of our focus groups, with a disproportionate number of international learners. International students were not recruited separately than domestic students: all learners were welcomed to participate equally. Figures from 2019-2020 reveal that 33% of college students, and 16% of university students in Ontario are international learners.²⁵ 14 of our 41 (34%) focus group participants and 37 of 117 (32%) respondents

to a question in our survey self-identified as an international learner. We recognize that this scenario is not the norm for most micro-credential learners, but the perspectives of these international learners highlighted the demand for universality and global recognition when producing a virtual wallet.

Another limitation is that very few learners currently use a virtual wallet for educational credentials. We found that 74 of 410 survey respondents (18%) currently use a virtual wallet specifically for their micro-credentials. As we recruited survey participants from the eCampusOntario Badge Passport, this accounts for some users. Virtual wallets outside of an educational context are far more ubiquitous, so we used them as a way to get learners thinking about a virtual wallet for educational purposes.

An additional limitation discovered during focus groups was that some participants who qualified as learners (17 of 41 or 42%) were also employed in the postsecondary sector as educators and administrators. In order to remove some educator and administrator bias from responses, all focus group participants were reminded at the beginning of focus groups to answer questions from their perspective as a learner, rather than that of an educator or administrator. On several occasions, focus group participants would start to reply to questions, and retracted and reframed their responses as a learner.

25 Statistics Canada, "Prior to COVID-19, international students accounted for the growth in postsecondary enrolments and graduates." November 24, 2021. <https://www150.statcan.gc.ca/n1/daily-quotidien/211124/dq211124d-eng.htm>

Demographics

Demographic data was collected by the research team during both the survey and focus groups. Data was collected on age of learners, learner track, field of study, micro-credential issuing institution, and field of employment (of those who identified in categories other than student). The collection

of demographic data in the survey was optional. Demographic data in focus groups was collected through qualitative responses, with many learners self-identifying demographic details in their responses to questions.

Age

Number of Learners by Age Group (Survey Data)

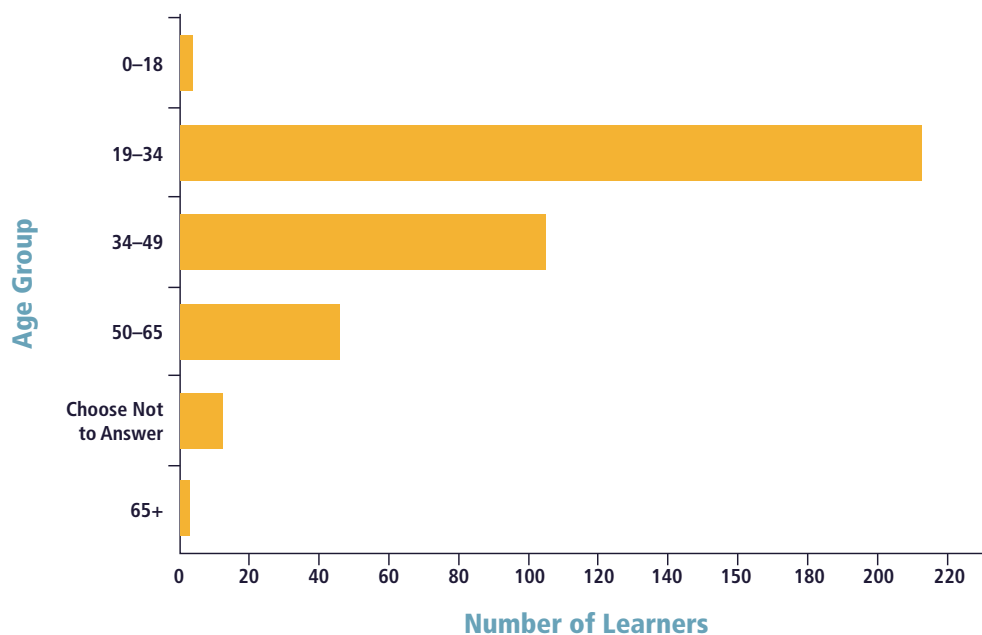


Figure 1: Survey Respondents by Age

Data collected from 383 survey respondents revealed that 56% of micro-credential learners are between the ages of 19 and 34. This suggests that many micro-credential learners are traditional track learners, recent graduates, and young

professionals.²⁶ Most micro-credential learners are at early stages in their careers, and will require a virtual wallet with longevity, as their careers may last upwards of 45 years.

²⁶ A traditional track student is a learner who has followed the typical path of education, moving from high school directly into college or university. Most traditional track learners are between the ages of 17 and 23 and identify as undergraduate students and college students.

On the other hand, the subset of survey participants who participated in focus groups were primarily in the 34-65 age range (55% of participants), which

informed the research team about the needs of mid- and late-career professionals.

Learner Track

Number of Learners by Learner Background (Survey Data)

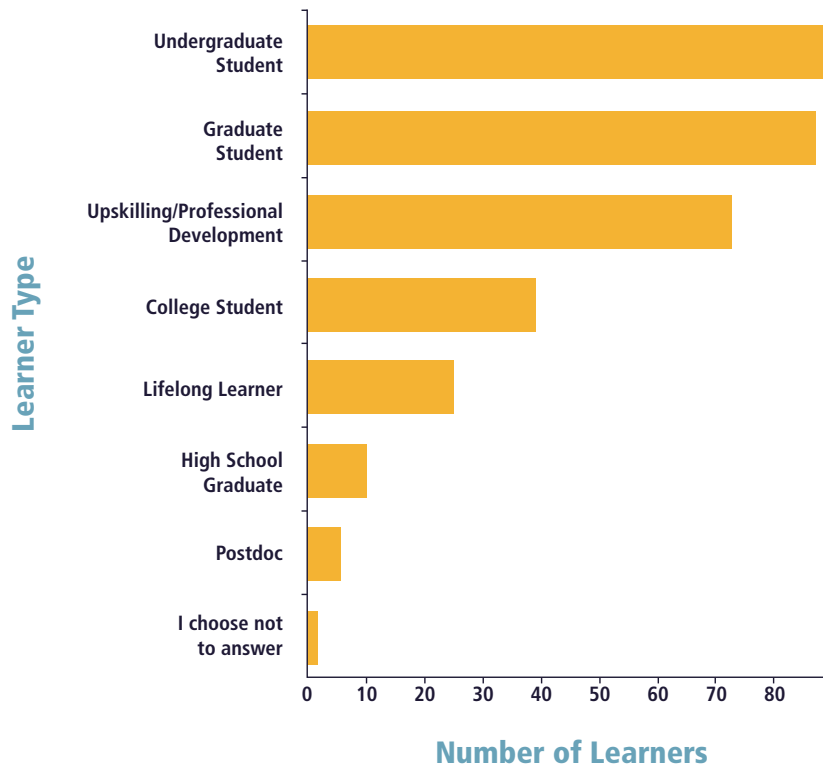


Figure 2: Survey Respondents by Learner Track

Related to the age data, data collected in the survey reveals that the vast majority of learners identify as traditional track students. Of 427 respondents to this question, 273 (64%) identified as an undergraduate student, graduate student, or college student. Of survey respondents who

identified as traditional track students, 67% were domestic students and 33% were international students. 125 respondents (29%) identified as upskilling, professional development, or lifelong learners.

Top Five Micro-credential Field of Study

The data collected in the survey on field of study for obtained micro-credentials, what skills learners are interested in acquiring, and if this correlates to their current field of employment. Data regarding

employment and field of study may explain some of the features learners sought in wallets and can inform the sector as a virtual wallet system is developed.

The top five fields of study for micro-credentials included:

1. Education (Primary, Junior, Intermediate, Senior, and Postsecondary)
2. Business, Commerce, Finance & Administration, Career & Preparation
3. Communications and Media
4. Architecture and Design
5. Computer Science

These fields accounted for 41% of all micro-credential learning in our survey.

Micro-credential Issuing Institution

The research team collected data on which publicly-assisted Ontario Indigenous Institute, college, or university issued the micro-credential held by respondents. In addition, we also asked learners if they have received micro-credentials from private institutions, out of province institutions, and/or foreign institutions. This data has been collected

to inform the sector that a virtual wallet needs to accept micro-credentials from a variety of sources.

The following data was collected in the survey from 467 responses. Indigenous Institutes, colleges, and universities with no respondents have been cleared from the data.

Micro-credentials by Issuing Ontario Institution:

Field	Percentage of Micro-credential Learners	Number of Respondents
Seneca College	17.13%	80
Conestoga College	8.78%	41
University of Toronto	7.07%	33
Brock University	6.21%	29
Ontario Tech University	4.07%	19
Canadore College	4.07%	19
Humber College	3.64%	17
Durham College	3.43%	16
Cambrian College	3.21%	15
Mohawk College	3.21%	15
Carleton University	2.78%	13
Toronto Metropolitan University	2.78%	13
Algonquin College	2.57%	12
Georgian College	2.57%	12
Algoma University	2.57%	12
University of Waterloo	2.14%	10
Confederation College	1.93%	9

Micro-credentials by Issuing Ontario Institution:

Field	Percentage of Micro-credential Learners	Number of Respondents
Centennial College	1.93%	9
Collège Boréal	1.50%	7
McMaster University	1.28%	6
Fanshawe College	1.07%	5
Northern College	1.07%	5
York University	1.07%	5
Loyalist College	0.86%	4
Kenjgewin Teg	0.86%	4
Ogwehoweh Skills and Trades Training Centre	0.86%	4
University of Ottawa	0.86%	4
Lambton College	0.86%	4
Lakehead University	0.64%	3
Sheridan College	0.64%	3
Laurentian University	0.64%	3
Oshki-Pimache-O-Win : The Wenjack Education Institute	0.43%	2
First Nations Technical Institute (FNTI)	0.43%	2
Western University	0.43%	2
OCAD University	0.43%	2
University of Guelph	0.43%	2
St. Clair College	0.43%	2
Wilfrid Laurier University	0.43%	2
Trent University	0.43%	2
Queen's University	0.43%	2
Nipissing University	0.43%	2
Six Nations Polytechnic	0.21%	1
Niagara College	0.21%	1
Université de l'Ontario français	0.21%	1
Seven Generations Education Institute	0.21%	1
La Cité	0.21%	1
St. Lawrence College	0.21%	1
University of Windsor	0.21%	1
Fleming College	0.21%	1

Table 1: Micro-credentials by Issuing Ontario Institution

Micro-credentials Issued by Non-Ontario Publicly-Assisted Issuers:

The following data was collected in the survey and includes responses from 442 learners.

Micro-credentials Issued by Type of Issuer (Survey Data)

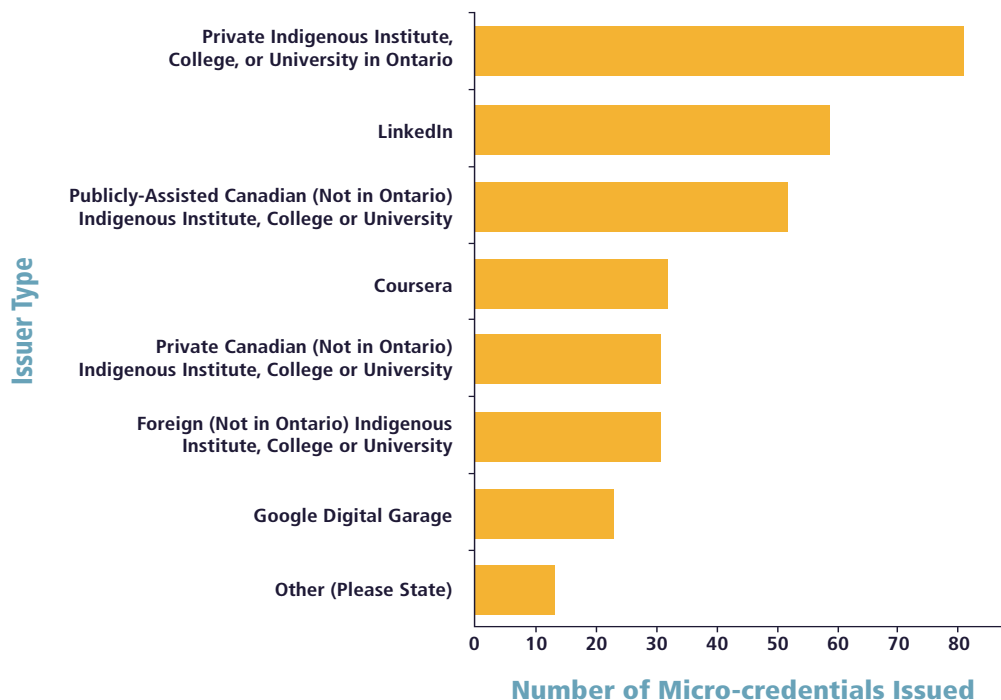


Figure 3: Micro-credential Issuers (Non-Ontario Public Institution)

Of the 442 responses to this survey question, 58% of respondents hold a micro-credential issued by a private institution or business, in addition to a micro-credential from an Ontario Indigenous Institute, college, or university. The three most popular alternative micro-credential issuers are: Private Indigenous Institutes, private colleges, or private universities in Ontario; LinkedIn; and Canadian publicly-assisted Indigenous Institutes, colleges, or universities outside of Ontario. Focus group participants also indicated that they collect

micro-credentials from professional governing bodies and industry partners (examples include Principles of Healthy Childhood Development High Five, manufacturer product and machine training, and Certified Professional Accountants of Ontario PD Passport courses). This data highlights that a virtual wallet needs to accept micro-credentials from a multitude of Ontario institutions, those earned at institutions outside of Ontario and at private institutions, as well as industry and professional governing body certifications.

Field of Employment

The research team collected data on fields on employment of those who identified as lifelong learners, re-skilling, and employed to reveal how digital credentials may be adapted for the needs of people in different professions. Conversations

with learners in focus groups revealed that gaining employment in some fields of work requires additional considerations, such as test scores, professional certifications, portfolios of work, and letters of recommendation. By determining

which fields micro-credential learners work in, this informed some of the profession-specific features that learners suggested during our consultations.

The Top 10 Career Fields of Micro-credential Learners

Data collected from 298 survey respondents. The top ten professions represent 76% of responses to this question.

1. Education (Postsecondary Administrator, Instructor, Researcher)
2. Computing or IT
3. Engineering or Manufacturing
4. Business/Consultancy/Management
5. Accounting/Banking/Finance
6. Healthcare
7. Media/Digital
8. Marketing
9. Education (Elementary)
10. Charity/Volunteer

Current Use of Virtual Wallets

A wide variety of virtual wallets for education have emerged around the globe. Participants in this research were not required to be users of a virtual wallet system in order to gain a wider sample size and to recognize dissenting opinions of non-wallet users. We asked survey and focus group respondents about their interactions with existing virtual wallet systems to address the following questions: which virtual wallets they use, why they choose to use (or not use) virtual wallets, their interactions and experiences with existing virtual wallet systems, and learner perceptions of the name “virtual wallet”.

To gauge participant perceptions of virtual wallets, two definitions were used to introduce the subject:

Virtual Wallets (Educational): in an educational context, virtual wallets are a secure, personalized, online digital repository into which Colleges, Universities, and other postsecondary education institutions may issue and load graduation credentials, awards, micro-credentials, and digitized transcripts for students and graduates to access, view, and share with potential employers, regulatory bodies, and others at any time.

Virtual Wallets (Broad Definition): An electronic device, online service, or software program (such as a mobile app) that allows one to store their driver's license, health card, loyalty cards, bank accounts, credit cards and other identification electronically. Some well-known virtual wallets include Apple Wallet, Google Pay, Samsung Pay, Android Pay.

The non-educational definition of wallets was introduced to learners as a concept they already recognize and understand. Recognizing that educational virtual wallets currently have low uptake, learners were presented with something familiar to gauge their understanding of virtual

wallets to understand how they use (or not use) virtual wallets and to see if they believe that their educational credentials belong in an existing virtual wallet. Using virtual wallets as a broad discussion point allowed us to research user expectations in a wallet system.

Of 410 survey respondents, 288 (70%) use a broadly defined virtual wallet. Users of virtual wallets revealed that the most popular non-educational virtual wallets they use are Apple Wallet (42%), Google Pay (26%), and PayPal (17%).²⁷ Analysis of survey and focus group data reveals that micro-credential learners who use virtual wallets commonly store bank cards, credit cards, gift cards, identity cards, membership cards and currencies in their virtual wallets.

Only 74 of 410 (18%) respondents currently use a virtual wallet specifically for their micro-credentials (such as eCampusOntario's Open Badge Passport). This indicates that regardless of the widespread use of non-educational virtual wallets, few survey participants are holding their micro-credentials in a virtual wallet. Despite the uptake of current micro-credential virtual wallets, when survey learners were asked if they wanted a virtual wallet for all of their educational credentials including, student identification cards, transcripts, micro-credentials, certificates, letters of enrollment, professor letters of recommendations, and degrees, 357 of 410 respondents (87%) indicated that they desired this kind of service. When it comes to a virtual wallet specifically for micro-credentials, 375 of 410 respondents (91%) indicated that they are interested in a micro-credential wallet, or already use a micro-credential wallet. In our focus groups, 95% of participants expressed interest in the idea of a micro-credential wallet.

27 The final 15% of non-educational virtual wallets used by learners include Ali Pay, Android Pay, Microsoft Pay, Fitbit Pay, Garmin Pay, Samsung Pay, and Meta (Facebook) Pay.

Recognizing that the majority (70%) of survey respondents currently use a virtual wallet, learners were asked if they would be interested in holding their micro-credentials in an existing non-educational virtual wallet such as Apple Pay or Google Wallet. The survey indicated that 291 of 405 respondents (73%) said yes, 77 (19%) said no, and 32 (8%) were unsure.

Analysis of survey responses revealed that learners use virtual wallets and are interested in storing their micro-credentials and other educational documentation in a virtual wallet. Data from qualitative answers collected in focus groups reveal why learners use wallets, why they avoid using wallets, how they recognize and use educational wallets, and their thoughts on the name 'wallet'.

Why Learners Use Wallets

Over 90% of focus group participants indicated that they currently use some form of a virtual wallet. The current users were asked to identify why they used a virtual wallet (traditional and educational). The top responses from our focus group participants were:

1. Convenience
2. Ease of Access
3. Way of the Future
4. As a Means of Storage

The word convenience was used often by focus group participants to describe why they choose to use a virtual wallet. Most learners associated virtual wallet convenience with the use of a virtual wallet on a mobile device, rather than tablet or computer. One learner described the virtual wallet on their mobile device as a "one stop shop." Another learner remarked that they carry their phone everywhere and often forget their physical purse and wallet. By storing everything digitally on their phone, it is convenient for them to remember where things are and locate things when they're required.

70% of focus group participants voiced that virtual wallets are becoming increasingly common, with widespread use and application. One learner remarked that storing things in a digital wallet is convenient and also the "way of the future." The learner noted that as virtual wallets become increasingly embedded in websites to facilitate ease of transactions, hold membership data, and store

passwords, they no longer need to locate where they keep physical copies. A self-identified "late career" focus group participant said that they recently got their first virtual wallet on their mobile device to "keep up."

When it comes to educational credentials, several learners reported difficulty keeping track of their digital credentials. One learner remarked that when they completed their micro-credential, an email was sent to them with a link to the digital badge, and instructions on how to add the badge to their LinkedIn profile. The learner admitted to "being lazy" and said that they did not bother to follow the instructions but added the course to their "Certifications" section of their LinkedIn profile without embedding the badge. Another learner remarked that they don't even know where their university diplomas are and wouldn't know how to produce them if an employer ever requested them. Multiple learners expressed that between taking degrees, certificates, and micro-credentials at multiple institutions, it is hard to keep track of student login data (such as usernames, student identification numbers, and institution specific passwords). This data is often required to request verification of course completion, transcripts, or copies of certificates. One learner described this as a "frustrating process, when I've taken over twenty micro-credentials at different institutions." 90% of focus group participants expressed that a virtual wallet for their educational credentials could be the solution to this organizational problem.

Why Learners Avoid Using Wallets

Less than 10% of focus group participants either refuse to use or have avoided using a virtual wallet (traditional or educational). The group of participants who refused or avoided digital wallets overwhelmingly overlapped with mature and late-stage career demographics. Their top reasons for refusal and avoidance were:

1. Digital Divide
2. Security Concerns
3. The Physical Works Just Fine

One reason why learners avoid using virtual wallets can be attributed to the digital divide and digital literacy gaps. Five focus group participants (12%) were between the ages of 50 and 65+, four of whom (10%) indicated that they would not know how to use wallet technology, and one (2%) who indicated that their digital devices may not be able to support a wallet. One mature focus group participant, a self-described “tech dinosaur” explained that “I just don’t understand the technology.” Another explained, “I do not use a wallet because I have no idea how to set it up and really have no idea what it is. It just seems too complicated; I prefer physical cards and documents because I’m able to keep track of them and use them when I need them.” Any

virtual wallet will require a comprehensive guide and explanation to ensure equity for all users.

Other learners expressed concerns about their data security and privacy in a virtual wallet. 10% of learners in focus groups said that they “do not trust the technology” and do not feel safe storing sensitive data on their mobile devices, citing fears of identity theft. The participants who answered in this manner were comprised of 4 of the 5 mature learners, and two additional participants who suggested they would feel unsafe with their personal and financial data in any digital environment. These responses formulated some learner suggestions on what would make them comfortable storing their data in a virtual wallet, which can be found in the *Security and Ownership of Credentials* section of this report.

11 of 41 (27%) focus group participants also suggested that at this moment in time, they see no use for a digital wallet as “the physical works just fine.” One learner explained how they keep paper copies of their educational credentials, and print out certificates earned online, which can then be photographed or scanned to produce a digital copy.

Learners and Educational Wallets

Only 74 of 410 survey respondents (18%) currently use a virtual wallet specifically for their micro-credentials. 39 of 41 focus group participants (95%) cited a lack of knowledge of virtual wallets for education as one of the reasons for low uptake. One participant said they received an email from their college about adding a recently earned micro-credential badge to the eCampusOntario Open Badge Passport; without the email, they would not have known about the service. Another focus group participant said they received a similar email, but had no knowledge about the Open Badge Passport or what advantages it gave the learner, yet still created an account because their college — an institution

they trusted, suggested they do so.

Focus group participants overwhelmingly revealed that they think of LinkedIn as both an employment and educational credential repository. Ninety percent of focus group participants have added their micro-credentials to their LinkedIn profiles under the “Licenses and Certifications” heading. However, of this majority, only (3 of 41 (7%) imported the digital badge associated with their micro-credential, and instead manually input the course name, institution, and date of completion. Manual importation of micro-credentials with digital badges leaves out the data on assessed learning, core competencies and skills gained, and endorsements. A learner in our

focus groups described LinkedIn as a “universally recognized service” for employment. Another learner added that LinkedIn is the best platform to hold their educational credentials as they already apply for jobs directly on the website and are contacted by recruiters on the platform’s messaging system. Some learners believe that LinkedIn serves as a social extension of a micro-credential, as it allows for them to connect with other learners and the instructor outside of coursework in a professional environment.

Learners who participated in focus group discussions were reminded that LinkedIn is a private company, which could withdraw access to services or features at any time. Learners were asked “What if LinkedIn stopped allowing users to import their own credentials and only allowed users to add certifications from the LinkedIn Learning platform?” This idea upset many focus group participants who

felt that their LinkedIn profile is their digital résumé and houses all of their educational credentials in one space. One learner said, “Nobody [Employers] has heard of Badge Passport, so LinkedIn adds legitimacy [as a place to hold credentials].” Other learners suggested that a future virtual wallet would need to have easy integration to LinkedIn, a feature that will be discussed in the *Features for a Virtual Wallet* section.

Only 2 of 41 (5%) focus group participants had heard of the MyCreds pilot project; one participant in their capacity as an administrator in the Office of the Registrar, and the other as a learner using the platform. The learner said, “I look forward of [sic] its functionality, and think it’s extremely important... more people need to hear about it.” The administrator did not know the name of MyCreds and referred to it as the “AROC wallet [sic].”

Learners and the Name “Wallet”

Focus group interviews revealed that 23 of 41 focus group participants (56%) strongly dislike the name “wallet”, as they feel that it has a financial and transactional connotation that is not aligned with holding or sharing a micro-credential or educational credential. One learner indicated: “I am not using my micro-credential to buy a job, so wallet doesn’t sit well with me.”

In order to determine if learners had preferential names for a virtual repository for micro-credentials, learners were presented with the names: Portfolio, Passport, Vault, C.V. and Résumé. Learners were also offered the words Education, Credential, and Skills to supplement the aforementioned names. Overwhelmingly, the word “Passport” was the most disliked alternative to wallet by 31 of 41 focus group participants (76%) because of social and political connotations associated with the

“Ontario Vaccine Passport” during 2021 and 2022. One learner said, “My head immediately went to all the blowback about vaccine passports and restaurants.” 10 of 41 focus group participants (24%) also disliked Portfolio, C.V., and Résumé because they felt that this may blur the lines between traditional documents and a virtual repository for micro-credentials. The term vault was the most widely accepted name for a virtual repository (19 of 41 learners or 46%). Three focus group learners (7%) suggested that vault sounds too secure and inaccessible to share with others. Three other learners (7%) indicated they preferred the words ‘credential’ and ‘skills’ over ‘education’, as they believe that gaining skills or credentials are the reasons for taking a micro-credential and are what employers are looking for.

How Learners Foresee Using an Education Wallet

In our consultations, learners identified use cases in favour of a virtual wallet for micro-credentials and educational credentials more broadly. When survey participants were asked, “Did you take a micro-credential for the purpose of gaining employment, upgrading your skills for work, or entry into further education?” 347 of 387 respondents (90%) responded “yes.” An additional question asked survey participants if they believe that showcasing their micro-credential on a résumé, C.V., or on a professional development tracker helped them gain employment, a promotion, a raise, or other favorable employment status. 242 of 347 respondents (70%) believed that displaying their micro-credential in an employment related circumstance had a favorable employment

outcome. Focus group participants revealed that they overwhelmingly foresee using a virtual wallet for employment and obtaining future educational opportunities.

Learners foresee using a virtual wallet for gaining employment but can also be used by those who are employed. Learners also see how a virtual wallet can be used for obtaining further education and other select uses outside education and employment. Beyond these use cases, learners demand universality in a wallet system. The postsecondary sector can use this information to understand the learner use cases for a wallet, which inform some of the features they suggested for a virtual wallet, as outlined in the *Features for an Education Wallet* section.

Gaining Employment

Overwhelmingly, 283 of 410 survey respondents (69%) indicated that they believe they would need a digital copy of their micro-credential for gaining employment. Focus group participants expanded on this idea and indicated that they believed that the ability to share their micro-credentials with a potential employer was the top reason for having them stored in a virtual wallet. When survey participants were asked to describe how they may potentially use a micro-credential in a virtual wallet, they commonly used phrases such as “employment”, “interview,” “résumé,” “job,” “employer,” and “application.” Focus group participants indicated that they display their micro-credentials to employers on their LinkedIn profiles, and list their micro-credentials under education,

additional education, or professional development headings on résumés and C.V.’s.

However, learners expressed some concerns over sharing micro-credentials with potential employers. Learners suggested that the skills and competences associated with a micro-credential need to be clear and easy for potential employers to access.²⁸ One learner said, “I have a micro-credential called Digital Skills in the Workplace, what does that mean? There’s level one, two, and three. What does that mean if I’m level three?” Another learner said, “I’ve had to explain what a micro-credential is, because the employer didn’t know.” Learners raised many concerns over employer understanding of micro-credentials, recognition of skills associated

28 These sentiments were echoed in a Digital Credential Consortium report on employer recognition of digital credentials. Their report found that digital credentials are too granular at the skill level, as employers still operate hiring practices at a higher skill level, relying on degrees and letters of recommendation. Digital Credential Consortium. *Credentials to Employment: The Last Mile*. September 30, 2022. <https://digitalcredentials.mit.edu/docs/Credentials-to-Employment-The-Last-Mile.pdf>

with micro-credentials in contrast to traditional programs, and if employers have the capabilities to view a virtual wallet. Learners also highlighted concerns related to the privacy and security of sharing educational credentials with others, which are explored in the *Security and Ownership of Credentials* section.

We asked focus group participants if they have ever been asked to provide proof of their micro-credential for an employment related scenario;

For Current Employment

In addition to showing potential employers micro-credentials in a virtual wallet, some learners indicated that there may be advantages to sharing micro-credentials in a virtual wallet with current employers. Of 410 respondents, 231 (56%) believed that they would need a digital copy of their micro-credential to display to their employer as part of professional development.²⁹ One focus group participant working in higher education explained, “I haven’t really boasted about it other than in my annual review meeting. There’s also a spot on our employee portal to upload micro-credentials as part of our academic credentials.” Several other focus group participants said that they spoke about their micro-credential learning in performance reviews but were never asked to produce or verify the credential.

Several focus group participants expressed that they belong to professions with professional

not a single participant has been asked. However, some focus group participants working in higher education (as instructors and professors) and regulated industries (such as teaching, accounting, and medicine) have had to produce degrees, certificates, and diplomas at some stage in their careers. As hiring practices change and employers obtain a better understanding of micro-credentials, the ability to verify micro-credentials may be needed in a more robust form than currently exists.

governing bodies (such as teachers, accountants, and medical professionals) and expressed how a virtual wallet could ease professional development tracking, accreditation credit earning, and speed up professional certification if the virtual wallet were to be integrated with governing bodies. One learner expressed, “I earn professional development credits from here and there, then I need to organize and compile them for [governing body].” However, this is not the case for all governing bodies, as some are already integrated with postsecondary institutions. In the survey, three elementary teachers indicated that a virtual wallet may not be needed for their profession, as Additional Qualifications (micro-credentials) are automatically submitted by educational institutions to the Ontario College of Teachers. A future virtual wallet for Ontario’s micro-credential learners should have integration with many Canadian and Ontario professional governing bodies.³⁰

29 This is pertinent given that Statistics Canada has reported that 45.5% of undergraduate degree holders returned to full-time studies within ten years of graduation, the large majority (90.4%) of whom return within five years. Statistics Canada, “Postsecondary Students in Canada 10 Years After Graduation.” January 2023.

30 Some learners also expressed integration with professional credentials not associated with traditional academic institutions, such as those offered by manufacturers and directly from governing bodies.

Obtaining Further Education

In the survey, 213 of 410 respondents (52%) believed that they would need to produce a digital copy of their micro-credential to obtain further education. However, 357 of 411 respondents (87%) indicated that they would like to have access to a virtual wallet to store all of their digital education credentials (this includes degrees, diplomas, certificates). This suggests that more learners want a virtual wallet for all digital educational credentials, not just micro-credentials.

Focus group participants revealed that a virtual wallet for all digital educational could be an essential component to the application processes for higher and further education. They indicated that the gathering of transcripts, letters of recommendation, and creating digitized copies of degrees, diplomas, and other parchments was a pain point in the process of applying to graduate

school. A virtual wallet which could hold digitized and verifiable copies of educational credentials, not just micro-credentials, could accelerate and declutter these processes. Focus group participants also indicated that they have incurred high costs when requesting transcripts, copies of diplomas, and other parchments from Office of the Registrar. One learner indicated that it cost them several hundred dollars to request credentials and transcripts from several institutions when they applied to doctoral studies. A virtual wallet, which allows the learner to hold all of their educational credentials, could alleviate the costs associated with learners requesting new copies of credentials from Offices of the Registrar, and meets learner demands for universality, as discussed later. This is currently being piloted by select institutions through the MyCreds platform owned by the Association of Registrars of the Universities and Colleges of Canada.

Outside Uses of an Education Wallet

Outside of education and employment, learners identified two unique scenarios where a virtual wallet for educational credentials would be useful: immigration and banking/financial services.

International learners in our focus groups indicated that a virtual wallet which stores all their international and domestic educational credentials (including micro-credentials) would ease processes associated with immigration, including visas, permanent residency, and finding employment rapidly upon arrival in Canada. One focus group participant resides in a South-East Asian country and has been taking micro-credentials at an Ontario postsecondary institution in order to have advanced placement at that institution when they immigrate. This learner expressed that a virtual wallet would make the assembly of documents for immigration easier and may even allow them more mobility to apply to other Ontario postsecondary institutions when they arrive in the province. They also indicated that they believed by holding

Ontario-earned credentials, they would find employment quickly. Several international learners also expressed interest in having their foreign credentials held and verified in an Ontario-based application, a topic discussed at length in the *Features for an Education Wallet* section.

A second category identified by focus group participations was demonstrating enrollment in micro-credentials and other postsecondary education for banking and financial services. Demonstrating to a bank that a learner is enrolled in postsecondary education sometimes allows learners to draw money from Registered Education Savings Plans (RESP) and access student loan and line of credit programs. If a digital credential could also serve as the verification of enrollment in a micro-credential, this could alleviate some of the processing times associated with student loan regimes like Ontario Student Assistance Program (OSAP). The banking and financial services demand for a virtual wallet is significant: out of 469 survey respondents, 145

(31%) paid for their micro-credential “out of pocket” and 121 (26%) paid with Ontario Student Assistance Program (OSAP).³¹ One learner indicated that the ability to demonstrate micro-credential

or postsecondary course enrollment in a virtual wallet, and attaching that verification to an OSAP application, would accelerate the process.³²

Demand for Universality

As learners indicated uses for a virtual wallet system, they also demanded universality across Ontario and Canadian postsecondary institutions. Learners feared that employers would not recognize a virtual wallet system or know how to ask for micro-credentials in a virtual wallet system if a common system were not used by all postsecondary institutions the province, or even country. One focus group participant said, “If I am applying for a job and the institution does not recognize, or can’t open this virtual wallet, what’s the point in having it? I think I would get frustrated and abandon my application if I don’t

know for sure that certain institutions would accept it.” Another focus group participant suggested that not only should the virtual wallet be universally adapted, but the means of verification should also be universally adopted. The learner said, “I think it would be really impactful to have some universal way for other folks to validate what you are putting in there is true, even if there are different wallets at different institutions.” Learners want a virtual wallet system that is recognized across Ontario, Canada, and internationally.

31 23% of survey respondents had their micro-credential paid in full or partially covered by their employer.

32 Learners indicated that a major issue with the OSAP program is a lag in time between OSAP applications, verification of enrollment by a Registrar office, and the release of funds to a learner.

Features for an Education Wallet

As part of our consultations, learners suggested a variety of features they would want to see in a virtual wallet for their micro-credentials and other educational credentials. Many of these features are informed by the primary uses learners foresee for using a virtual wallet: gaining employment, career progression, obtaining future education, and banking/immigration purposes. These features have been organized categorically, being sorted into the areas of shareability, socializing digital credentials, user experience, and other desired features. These features can be used by the sector to inform the development of a virtual wallet for micro-credentials with the learner-user in mind.

One feature that needs to be highlighted is that learners support storing their micro-credentials in an existing virtual wallet such as Apple Wallet, Google Pay, Samsung Pay, or Android Pay. In the survey, 271 of 405 participants (67%) wanted to store their micro-credential in an existing virtual wallet. 131 of 405 participants (32%) indicated they want a stand-alone mobile app to serve as a virtual

wallet, and 81 of 405 (20%) indicated that they want a website to serve as their virtual wallet. Focus group participants feared that a specific application or website serving as a micro-credential virtual wallet would be “just another app that [they] never use.” Another participant said that “a micro-credential virtual wallet would basically sit there for years until I need it when applying for jobs.” Despite supporting integration to existing virtual wallets, focus group participants expected some way of categorically organizing and hiding their educational credentials within a wallet like Apple Wallet. One learner said, “I don’t want to pull out my micro-credential by accident when purchasing bananas.” Our research finds that there are two camps of learner perceptions; one for storing micro-credentials in existing virtual wallets (such as Apple Wallet, Google Pay) and another which advocates for creating a brand-new virtual wallet with all the features this section explores. This suggests that a potential database of verified micro-credentials may need to serve several types of virtual wallets.

Shareability and Verification

Sharing verified credentials held in a virtual wallet is central to the use cases of a virtual wallet identified by learners in both the survey and focus groups. Verification is one of the core principles of a micro-credential as identified in eCampusOntario’s *Micro-credential Principles and Framework*.³³ When our 406 survey respondents were provided with a list of features they would like to see in a virtual wallet, the top response was a secure method to share their micro-credential with an employer, selected by 222 participants (55%). The second highest response, selected by 197 learners (49%), was the ability to share credentials as a QR code. This highlights

that different ways to share micro-credentials, or shareability, was at the top of learners’ minds when participating in this research.

In focus group conversations, we discussed with learners what shareability looks like to them. Central to their ideas of shareability was the concept of verification. To share a digital credential with an employer should serve as a means for the employer to automatically verify the credential. The top responses from focus group participants on how to share a verifiable digital credential were QR codes, expiring links, and the ability to email a

33 eCampusOntario, “Micro-credential Principles and Framework,” 2020. <https://www.ecampusontario.ca/wp-content/uploads/2020/11/Micro-credentials-en1.pdf>

verifiable link directly to recipients through the wallet platform. One focus group learner indicated that “QR codes are everywhere now. It could be shown on a mobile device at an interview or put on your résumé for potential employers to verify credentials.” Other learners favoured expiring links that could be shared with employers or emailed directly through the platform, as this would allow them to share their credentials as part of an application package.

Focus group participants were asked if a credential stored on a decentralized blockchain and held in a virtual wallet meets their demands for shareability and security. The research team explained to participants how the blockchain could serve as both the means of holding and verifying a credential. Overwhelmingly, participants did not understand blockchain. Two learners expressed concerns that it sounded like “cryptocurrency” and could not understand how it was a security feature. On the survey, only 56 (14%) participants selected “stored and verified on blockchain” as a feature they would like to see in a virtual wallet. If blockchain is selected by the sector as a favorable security feature for a virtual wallet, an educational campaign will be required to explain its purpose to learners.

Focus group participants were in favor of a “blue checkmark system” as a means of verification for digital credentials imported to other spaces from a virtual wallet. One learner suggested a “blue checkmark” next to imported credentials, similar to the system used by Twitter (formerly) and Instagram to verify the profiles individuals hold on their networks. Unlike a digital badge stored in a virtual wallet that includes details about the credential, an imported blue checkmark would simply verify that it was imported from a trusted source — a virtual wallet. Learners hope to share their credentials socially. As credentials are added to a résumé, personal website, digital job application, or LinkedIn profile from a virtual wallet, learners hope for a means of verifying their credentials. One learner explained, “This would prevent people who audited a course on Coursera, from listing Harvard as an

institution they attended on LinkedIn.” This method would allow credentials to “live” and be held in a virtual wallet, as well as be shared as verified credentials in other spaces outside the wallet.

One of the major concerns focus group participants had with shareability was limiting information that was shared and having the ability to group credentials together into “share groups.” Participants wanted full control over the different parts of the digital credential and what would be visible to potential employers. While most focus group participants indicated that they were comfortable sharing the name of the credential and the core skills and competencies, they were divided over displaying grades, associated coursework, and endorsements. Some focus group participants expressed that if a grade were to be displayed alongside a digital credential, employers may hire based on grades rather than a complete assessment of the candidate. One participant explained the concept of share groups through a personal anecdote, “I have switched career paths, and half of my educational credentials reflect a career I am no longer in. I would like to have the ability to group or organize my credentials to only display those that are relevant to the position I apply for.” It is important to note that some focus group participants were willing to share all details of their digital credentials when applying for further education.

As part of our survey, we asked learners to rate their level of comfortability sharing a micro-credential with different individuals. 386 learners rated their comfortability using a five-point scale where 5 meant very comfortable, 3 meant neither comfortable nor uncomfortable, and 1 meant very uncomfortable. The majority of learners were very comfortable sharing with potential employers, current employers, and college/university administrators. Learners ranked “accessible to anyone” with the highest “not at all comfortable” rating.

Survey Results of Learner Comfortability to Share Credentials

Field	5	4	3	2	1	Total # of Respondents
	Very Comfortable				Not At All Comfortable	
Potential Employers	51%	28%	14%	4%	2%	386
Current Employers	47%	35%	11%	4%	3%	385
College/University Administrators	45%	29%	21%	3%	1%	386
College/University Professors	38%	33%	20%	7%	3%	383
Learners who took the same micro-credential	35%	29%	21%	9%	7%	383
Accessible to anyone	19%	25%	20%	15%	21%	377

Table 2: Survey Results of Learner Comfortability to Share Credentials

Socializing Digital Credentials

Beyond sharing a verified micro-credential directly with employers and academic institutions, survey and focus group responses indicated that learners are interested in “socializing” their digital credentials. Learners have identified the process of socializing a digital credential to include sharing of digital credential on social media platforms, accessing learning analytics dashboards, and gaining access to specialized job boards. This is different from shareability in that sharing is done for purposes of verification, and socializing is done to share completion, and extend the outcomes of learning. In the survey, 186 of 406 respondents (46%) indicated that they want social media platform integration as a feature of their virtual wallet. Three mature learners in our focus groups indicated that they wanted to share and celebrate the earning of their micro-credential with their social networks on Facebook and Twitter, while younger learners indicated that they would rather keep the sharing of their credentials to a professional network like LinkedIn. Our findings indicate that learners would like to integrate their virtual wallet with a wide range of social media platforms.

Focus group participants identified the social aspects of a traditional class as something missing from a virtually obtained micro-credential. Social media integration through a virtual wallet was seen by focus group participants as a means to reclaim the social aspect of a class. One focus group participant indicated, “On LinkedIn, I could connect with others who have taken the micro-credential, or the instructor, to keep on top of what’s happening in the field or connect for future opportunities.” Another participant said, “It would be cool to see how others use their micro-credential.” Focus group participants indicated that these social media integrations would re-claim the missing “social aspect” of traditional in-class learning. In our survey, a quarter of respondents (25%) listed “Community” or the ability to interact and connect with other learners who completed the same micro-credential as a feature they desired in a virtual wallet.

Another desired social feature for a virtual wallet is access to an analytics dashboard. Focus group participants opted for a more relatable metric and referred to the analytics dashboard as a “you may also like” or “other learners also enjoyed” page as one might see on Netflix or Amazon. The

dashboard was recognized by learners a space which could suggest pathways for further micro-credential learning; provide pathways of using micro-credentials towards certificate, program, or degree learning; showcase the number of learners who have completed the micro-credential; showcase micro-credentials in the same educational field; and other data. In the survey, 147 out of 406 participants (36%) indicated that they would like an analytics dashboard as a feature of their virtual wallet. One focus group participant described the analytics dashboard as “something like Google Feed, but specific to my credentials. Because I am a continuing education learner, I am open to learning new skill and learn what’s hot with other learners. The dashboard could suggest courses to me, and tell me who’s offering them.” Learners are interested in learning more about their micro-credential, learners who took the micro-credential, and pathways for future learning, which can all be satisfied by an analytics dashboard integrated in a virtual wallet.

The final social feature that learners expressed interest in was integration to job boards. While social platforms like LinkedIn, which is used by 33 of 41 (81%) of focus group participants, also include job search and applications, learners expressed integration with platforms that strictly serve as job boards like Monster, Charity Village, and Indeed. In our survey, 91 of 406 participants (22%) indicated

that they would like to have their virtual wallet integrated with job boards. In our focus groups, learners indicated that the ability to attach verified credentials alongside a résumé and cover letter on a job board would be a feature of interest. One learner said, “this would validate to an employer right away that I have the skill they’re looking for and I’m the right person to hire.” Focus group participants lamented about how long job searches can be and hoped that their micro-credential could help to speed up this process.

Learners also expressed interest in gaining access to job boards for micro-credential learners with demonstrated competencies and skills. In our survey, 94 of 406 participants (23%) indicated that they would like to have their virtual wallet grant them access to a job board specifically for learners who have completed a micro-credential. One learner indicated, “this would streamline my job search, if employers were looking for people who completed specific micro-credentials.” Another learner said, “If a job board for people who know Python or other programming languages was created, my micro-credential could mean that I don’t need to do a programming test [for a job].” The integration with a micro-credential job board could be either a feature of the virtual wallet, or an extension to a micro-credential wallet program.

User Experience

In our consultations with learners, we asked what the experience of using a virtual wallet for their educational credentials may look like to them. As the user of the hypothetical virtual wallet, learners expect it to be reliable, have an interactive interface with smooth design, come with instructions and support, and be customizable to each user.

In our survey, 200 of 282 respondents (71%) of respondents indicated that the reliability of a virtual wallet was a “very important” feature of a virtual wallet. In a focus group, one learner expanded on this idea and said, “how often does the app need to

be updated, how much space does it take, how often does it crash? Students should be able to access it 99% of the time.” Learners expressed that existing virtual services for students, ranging from the OSAP Portal to institutional student portals and learning management systems, have significant amounts of downtime, rendering their services inaccessible to and unreliable for students. One learner indicated that they get their best work done in the middle of the night and expect student services to be available at all hours.

Learners also expect a clean and easy to use interface for the virtual wallet. In the survey, 104 of 406 respondents (26%) indicated that they expect the virtual wallet to have an interactive and smooth design. One learner in the focus group indicated that “[t]he user interface, if it’s too convoluted, complicated and looks sketchy, I probably wouldn’t use it.” As such, it is clear that UX design in consultation with learners should be conducted when developing a virtual wallet.

Some learners indicated that they may require instructions or tutorials available, as they have never used a virtual wallet before. One mature focus group participant indicated, “All new technology is a learning curve for me because I represent the technology dinosaur sector, but I do research and try and find out how to use these things. I want to make sure that there is an accessible participant support team in place so that if there [were] any problems, you could get help right away.” Focus group participants indicated that live chat help during initial launch, a comprehensive question and answer section, or tutorial videos on YouTube may help them adopt a virtual wallet.

In the survey and focus groups, learners indicated that they expect a virtual wallet to be customizable to the individual user. One of the customizable features that learners expect are compartments, categories, or folders to organize and store credentials. Focus group participants envisioned that these compartments would allow users to store credentials by date earned, type of credential, and subject matter. By allowing users to curate their credentials in a virtual wallet, focus group participants indicated that this would allow them to better organize their credentials when applying for a job. One learner who has switched career paths indicated, “I don’t need future employers to dig around all my career paths. I want to show them the skills for the position they’re hiring.” Compartments may also be useful if a virtual education wallet was integrated with existing virtual wallets. As previously mentioned, learners indicated that they would like to hold their digital credentials in an existing virtual wallet, but fear having them mixed in with everyday use items. By creating a compartment of consolidated digital credentials within an existing virtual wallet, this may alleviate learner concerns.

Other Desired Features

This subsection provides a list of some additional features that focus group and survey learners indicated they desire in a virtual wallet. These features were informed by learner experiences with current educational and employment practices.

Learners would like to have the ability to import and verify credentials earned outside Canada. We had several focus group participants who identified as international learners. They overwhelmingly indicated that they would like their foreign credentials held in the same virtual wallet as their Ontario-earned credentials because “they shape who I am as a learner.” These learners indicated that they experience hurdles having their foreign

credentials translated, verified, and notarized for use in Canadian immigration, applications for further education, and hiring practices. Integrating these processes into a virtual wallet would both alleviate these pressures and present a full picture of international learners’ educational history and skills.

Another feature learners are interested in having in a digital wallet is live translation of credentials, competencies, verification, and other embedded metadata. 63 of 406 survey respondents (16%) indicated that they would like live translation of digital credentials as a feature of a virtual wallet. One focus group participant indicated that they have worked abroad and needed to get all their

Ontario certifications and degrees translated and notarized into a non-English or French language.³⁴ They indicated that live translation within a virtual wallet would alleviate these pressures and streamline processes for international learners and Ontario educated learners working abroad.

Moreover, learners indicated interest in the ability to collect and hold digital copies of other educational credentials such as degrees, diplomas, certificates, letters of recommendation, hours collected at placements, co-op placement reviews,

and co-curricular records. Focus group participants indicated that a virtual wallet for education has a wide range of uses outside of just storing micro-credentials, certificates, and degrees. This indicates that learners want a virtual wallet that can be used to store their entire educational career, not just terminal segments.

Learners also indicated a wide array of security, privacy, and accessibility features that are discussed in the subsequent sections of this report.

34 Credential verification is a significant factor for both international learners and immigrants to Canada. The ability to notarize and verify international (digital) credentials as a feature of a virtual wallet requires further exploration.

Security and Ownership of Credentials

Operating in a virtual space, learners identified concerns over identity theft, account hijacking, data skimming, and phishing of a virtual wallet. Because digital education assets held in a virtual wallet have value, it is essential that users have full control over their virtual wallet and the access to it. Our consultations revealed how learners foresee protecting their login information, the security

of data held in the virtual wallet, ownership of credentials in virtual wallet, security protocols, and a repository model for issuing and holding credentials. Security and ownership of credentials are fundamental to the development of a virtual wallet as learners have identified security and ownership of their credentials as paramount concerns.

User Security

One learner described the need for user security in a virtual wallet by saying, “We need to protect my credentials [in a virtual wallet] because they’re personal.” Another learner in the same focus group conversation replied, “It’s not the credentials that need to be secure, it’s the account.” While learners debated how personal credentials are because they’re often shared with employers and a cohort of fellow learners, all learners agreed that their account and virtual wallet should be self-controlled and have single user access. When we asked learners what features would make them feel most secure storing their educational credentials in a virtual wallet, they listed two-factor authentication, login-partner authentication, and individual (rather than institutionally dictated) registration if feasible.

Learners indicated both two-factor authentication and login-partner authentication as user security features they would like to see in a virtual wallet. Learners mentioned Google Authenticator, Microsoft Authenticator, Duo Mobile, 2FAS, LastPass,

and Twilio Authy as two-factor authenticators that they currently use. Thus, a virtual wallet should work in conjunction with commercially available authentication tools. Some learners also indicated that they feel secure logging in using an authentication partner. Several focus group participants suggested that they like the financial institution login authentication that is used by the Canada Revenue Agency for tax purposes. Other learners suggested that social media login could also serve as an authentication partner, but some feared that would not make them feel as secure as a financial institution login partner.

Learners also expressed interest in a program similar to Apple FaceID, fingerprint verification, or pin-code to access their virtual wallet. Focus group participants further indicated that these security tools are pre-built into many mobile devices and could be a good feature to protect their virtual education wallet.

Data Privacy

Aside from the protection of their user accounts, learners also indicated that they expect the data held in a virtual wallet should be secure and protected. Learners revealed that data privacy includes their comfortability sharing credentials with different individuals, the ability to set privacy

levels or permissions when sharing credentials, the encryption and protections assigned to shared credentials, and the means of storing credentials (which could be any from a list of methods that include local, blockchain, cloud, and servers).

One of the central concepts related to data privacy we explored with learners was sharing digital credentials with others. In our survey, we asked learners to rate their comfort with sharing credentials with future employers, present employers, university/college administrators, university/college faculty, and accessible to anyone (see: Figure 2). In focus groups, we asked learners to expand on what makes them comfortable or uncomfortable sharing their credentials with different individuals or groups. Focus group learners indicated that sharing the name of the course, when they completed the course, and core competencies were the most comfortable features of a digital credential to share with others. Other features of a digital credential including grades, length of time to complete the credential, and delivered coursework would make some (12 of 41 learners or 30%) focus group learners feel less comfortable to share their digital credential with certain individuals. 37 of 41 focus group participants (90%) felt that they were most comfortable sharing verification of a completed credential and its associated skills. As a solution, six focus group participants suggested a virtual wallet featuring the ability to set privacy levels or permissions when sharing a digital credential. They indicated that privacy levels or permissions may include the ability to hide features like grades or length of time to complete a credential from employers but have them visible to college/university administrators. When sharing a credential, learners would like to select a privacy level for each individual recipient of a shared credential. This thought process informed some of the shareability features learners suggested for a virtual wallet including QR codes, custom links, and locking documents from duplication (screenshot, download, print).

Ownership of Credentials

A conversation emerged in our focus group discussions about ownership of a digital credential after it is issued. We asked learners if they feel that a digital credential belongs to them or if it belongs to the issuing institution. This developed into a larger conversation about how learners

Focus group participants also recommended that protections should be available for wallet users when sharing digital credentials. Learners indicated that there is no point of creating a secure virtual wallet system to share credentials if the receiver is able to screenshot, download, print, or otherwise replicate the shared credential. While metadata embedded in the credential may share the origins of a file, learners suggested a feature that indicates if a file has been screenshot, downloaded or replicated by the receiver. One learner described this feature as, “Similar to the Snapchat screenshot warning,” which informs the sender that their photograph or chat has been duplicated by the receiver. Another learner mentioned how some websites turn to black or white when someone attempts to screenshot. Learners want encryptions and protections embedded in their digital credentials which prevent replication.

Finally, learners were concerned about how their credentials are stored in a virtual wallet. We discussed local storage, blockchain, cloud, and physical servers with focus group participants. Local storage on a mobile device or laptop was a widely disliked option, as learners feared losing their credentials or getting locked out of their virtual wallet if they lost access to their device. As previously mentioned, many learners did not know what blockchain storage is, but those who understood the concept supported the decentralized storage and trusted the security of the blockchain. Finally, when it came to cloud and physical servers, focus group participants indicated that these servers should be housed within Canada to ensure the most secure operations. Learners are open to different storage methods, as long as they are not locally assigned to the learner’s device.

expect to add credentials to a virtual wallet, and who has authority over this process. Our conversations with learners revealed that they question if the ownership of credentials may extend to processes like modifying the credential after the fact, personal name changes, changes to

the course name, or added industry endorsements. Many of these conversations encompass the roles and responsibilities of the Registrar's Office at Ontario postsecondary institutions. The Registrar is responsible for admissions, records and registration, and graduation/convocation. Credentials are issued to learners under the combined authority of the Registrar, Chancellor, Vice-Chancellor, and Departmental Deans. Focus group participants posed questions regarding ownership of credentials after issue, and if the learner has the authority to make minor changes to the credential in a virtual

wallet (such as a personal name change) without the intervention of a Registrar's office.

In the survey, we asked learners if they would prefer to have direct control over their virtual wallet and request credentials to be added by the issuing institution, or if they would prefer institutions adding credentials to a centralized repository which directly adds them to a virtual wallet. Overwhelmingly, 60% or 233 of 389 respondents, preferred the direct control option.

Survey Learner Preference of How Credentials are Added to a Virtual Wallet

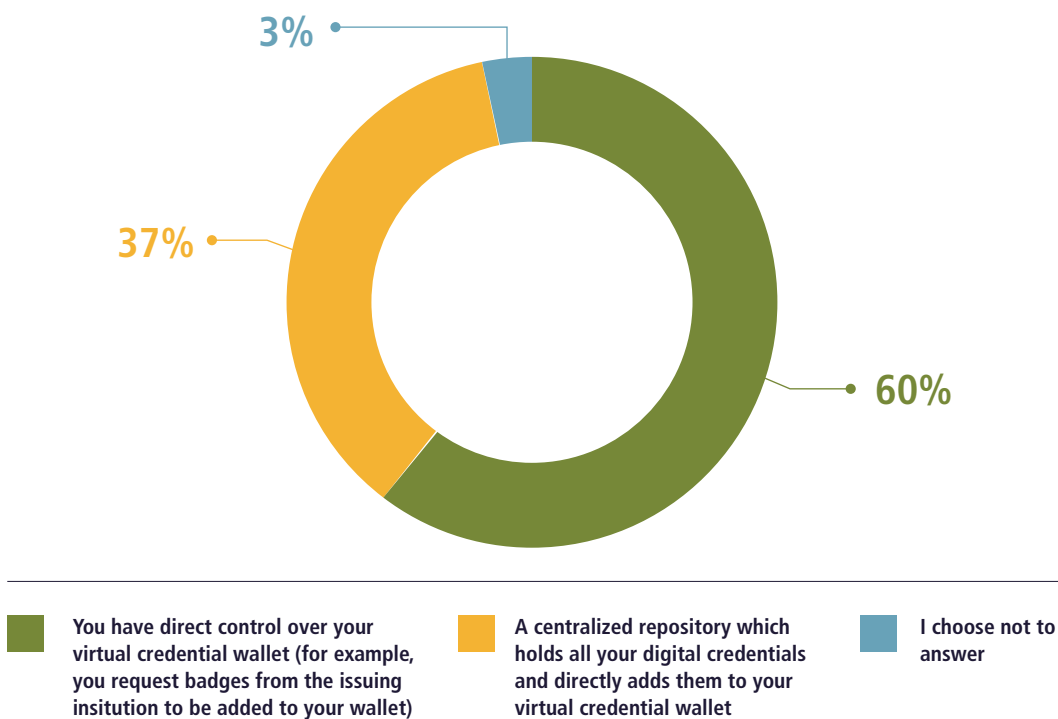


Figure 4: Survey Learner Preference of How Credentials are Added to a Virtual Wallet

Similar sentiments were echoed in focus groups, where learners did not think that a centralized repository holding credentials from multiple institutions would work smoothly. One learner indicated that a model where the learner adds the credential, and it is then verified by the issuing institution, may be the best way to “avoid red tape.” Another focus group participant echoed the red tape sentiment and said, “My experience

has been it's sometimes very difficult to get access to your educational information. It's almost as if the institution makes it their property rather than the student who earned it. If I controlled my micro-credential in my wallet, it would feel like I own it.” Some learners in focus groups expressed concerns that if their credentials were automatically added to a virtual wallet repository, this may mean the digitization of their credentials into a virtual

wallet without their consent. There was consensus amongst focus group participants, with 39 of 41 (95%) participants indicating that they would prefer to request their credentials be added to their virtual wallet by the issuing institution, rather than automatically added to a virtual wallet that they may or may not use. The sector will need to consider how to ask learners to consent to their credentials being added to a virtual wallet.

In the survey, 123 of 406 participants (30%) indicated that they want their virtual wallet integrated with institutional Learning Management Software (LMS) platforms, widely used at postsecondary institutions in Ontario (examples include Blackboard, D2L Brightspace, and Google Classroom). We asked focus group participants to expand on why they would want this feature, and some suggested that this would allow them to add a digital credential earned in a LMS directly to a virtual wallet. One focus group participant indicated that they are stacking micro-credentials to earn a certificate, all earned in the same LMS platform at the same college. This learner said, “holding the credential there [a LMS integrated wallet] would allow me to see my progress in one place.” This

reinforces that learners want ownership and control over adding credentials to their virtual wallet, but also how learners would like to see an ecosystem approach to digital technology enabling records coupled with learning.

Finally, the idea of modifying a credential after it is issued to a learner opened a debate over the ownership of credentials. In our survey, we asked 386 respondents if they were comfortable granting the micro-credential issuer, an Ontario Indigenous Institute, college, or university, access to modify a digital credential in a virtual wallet for purposes of adding endorsements, updating skills learned, or modifying names. 269 respondents (70%) indicated that they would be comfortable with these modifications. However, in our focus groups, six learners (15%) indicated that they would rather have the ability to make these modifications themselves because they are the “credential owner.” One focus group participant indicated that a “hybrid-model” of ownership is needed, which allows the learner to change their name and other basic information and allows the institution to add new industry endorsements and other metadata with the consent of the learner.



Barriers to Access

In our consultations, learners identified potential barriers to accessing a virtual wallet for educational credentials. We identified three major areas shaping the access to a virtual wallet: technological barriers, barriers as defined by the *Accessibility for Ontarians with Disabilities Act (AODA)*, and the cost associated with accessing a virtual wallet. Understanding these barriers can assist in ensuring inclusive, equitable, and accessible design when creating a virtual wallet. One focus group participant (who is also a micro-credential instructor) suggested that “the people

who struggle the most and who potentially need this the most, are those who take a micro-credential because they're working full time and want to improve their skills for better employment... it should be easy for them to access a virtual wallet and show their new skills.” As the sector develops a virtual wallet, we remind them that the wallet and digital credentials must be accessible to all learners and account for the many barriers that learners face inside and outside the classroom.

Technological Barriers to Access

Many of the technological barriers to accessing a virtual wallet have been informed by both a digital literacy gap and the digital divide: the unequal distribution of access to technology and its associated benefits. These barriers include access to modern mobile devices, tablets and computers, high speed internet, storage space on a device, and technological literacy. We asked both survey and focus group participants to identify any barriers to access, broadly defined. Overwhelmingly, the responses provided cited technological barriers.

In our survey we asked 386 learners to select or add to a list of barriers which may limit their access to a virtual wallet. 102 (20%) respondents said no

identifiable barriers, 145 (28%) indicated data space required to store an app or digital credentials, 128 (25%) said access to high-speed internet, and 119 (23%) said ownership of a mobile device. A virtual wallet should not require a large storage space, require minimal access to internet or data, and be available on computers, tablets, and mobile devices. Focus group participants reiterated the same technological constraints identified in the survey, but also mentioned they feared that a digital divide could create another barrier to employment for those who lack the skills to use a virtual wallet.

Survey Results: Barriers to Learner Ability to Use a Virtual Credential Wallet

Field	Choice
Space an-app or wallet would occupy on a mobile device	145
Highspeed Internet or mobile data required to use a digital wallet	128
Ownership of a mobile device	119
None	102
I choose not to answer	10
Total # of Repondants	515

Table 3: Survey Results of Barriers to learner ability to use a virtual credential wallet ³⁵

In focus groups, three mature learners indicated that they would need video tutorials, question and answer sections, or live support to help them with initial use of the virtual wallet. While this was

indicated in the *Features for an Education Wallet*, this is part of the digital divide. Technological literacy is a significant barrier to accessing a virtual wallet.

Barriers as Defined by the AODA

Both survey and focus group participants provided thoughtful responses about the needs of and barriers faced by learners with disabilities. The *Accessibility for Ontarians with Disabilities Act or AODA*, defines a barrier as “anything that prevents a person with a disability from fully participating in all aspects of society because of his or her disability, including a physical barrier, an architectural barrier, an information or communications barrier, an attitudinal barrier, a technological barrier, a policy or a practice.”³⁶ Learners in both the survey and focus group expressed that a virtual wallet for digital education credentials should be developed and implemented with accessible design in mind.

One learner with a background in app development suggested that toolkits like the Apple’s Developer Accessibility module should be used to ensure that a virtual wallet works with programs like VoiceOver, Switch Control, Guided Access, Text to Speech, closed-captioned or audio-described video, and other accessibility features. Any application, website, or module serving as a virtual wallet, as well as the access to digital credentials, should be designed with accessibility in mind to adhere to Ontario law.

³⁵ “Other” responses made up 2.14% or 11 responses. Many of the “Other” responses did not answer the question.

³⁶ Bill C-11, *Accessibility for Ontarians with Disabilities Act*, S.O. 2005, Amended April 19, 2016, Ontario Legislative Assembly, <https://www.ontario.ca/laws/statute/05a11>

Cost of a Virtual Wallet as a Barrier to Access

A final barrier identified in our research was the cost associated with accessing a digital wallet. Our comprehensive environmental scan and literature review revealed that certain digital credentials, namely those held on the blockchain or as Non-Fungible Tokens (NFT), have a nominal financial value assigned to creation of a digital credential. While the cost of producing the digital credential has not yet been passed onto the learner, this informed the research team to ask learners if they would be willing to pay for access to a virtual wallet to store their educational credentials. Of 387 respondents, 266 (69%) indicated that they would not be willing to pay for access to a digital wallet.

However, responses were slightly different in the focus groups, where 19 of 41 (46%) participants indicated that they would be willing to pay for access to a digital wallet. While most focus group participants preferred a free or nearly-free virtual wallet, learners expressed interest in premium and subscription payment models, or building the cost of a virtual wallet into course tuition or graduation fees. One learner explained, "I appreciate there's administrative processes that take place, and it's not free for an institution to go through the process of providing detailed information." Most focus group participants voiced their disdain for the high costs associated with requesting letters of enrollment and collecting transcripts from multiple institutions. They hoped that a virtual wallet would eliminate the cost of these processes or become a one-time fee to have these materials added to a virtual wallet. One learner expressed, "[W]e already pay

so many hidden fees, I'm sure the virtual wallet could be covered by one of these." 37 of 41 (90%) focus group participants felt that free is the best option; however, 19 of 41 (46%) learners are open to alternative means of paying for a virtual wallet.

One learner described a premium model: "I'm thinking like Spotify premium, where you pay to access ad-free, but for the virtual wallet the free version could have the basic offerings, and premium or paid, for translation and other nice-to-have features." Learners in the same focus group were intrigued by this payment model, with 7 of 8 saying they would be interested in a free and premium virtual wallet payment model. The dissenting learner in the focus group indicated that "if the purpose of this wallet is to gain employment, it shouldn't have a barrier to get it and everything it has to offer."

Six focus group participants (15%) indicated that a virtual wallet may only be used every few years, when seeking new employment, or applying for further education. They expressed that paying for a service with limited daily use would be "a cash grab" when they "already pay so much to take a class."

A virtual wallet for educational credentials should be free for learners to use, and very few learners indicated that they would be willing to pay for premium or additional features. A fee associated with accessing a wallet should be viewed as a barrier, limiting learners to access credentials they earned, and limiting learners from sharing these credentials.

Concern with Virtual Wallet Adoption

Our consultations also revealed barriers which may prevent widespread adaptation of a virtual education wallet for micro-credentials and digital education credentials more broadly. The three main apprehensions to adaptation highlighted by learners were LinkedIn as an education and employment wallet; that virtual wallets with digital credentials can't replace a traditional résumé and current hiring practices; and that learners fear that a virtual wallet won't have longevity or universal recognition. In

our survey, 30 of 411 (7%) respondents indicated that they do not want a virtual wallet for educational credentials (including degrees, diplomas, certificates, and micro-credentials). In the focus groups, all learners were open to the idea of using a virtual wallet but were very critical about the uses for and purpose of a virtual wallet for digital credentials. Some of the discussions with focus group participants indicated their apprehensions to adopting a virtual wallet.

LinkedIn as an Education and Employment Wallet

As previously indicated, focus group participants overwhelmingly revealed that they think of LinkedIn as both an employment and educational credential repository with 37 of 41 (90%) focus group participants adding their micro-credentials to their LinkedIn profiles and 38 of 41 (93%) participants having an active LinkedIn profile. Learners in our focus groups described LinkedIn as a “universally recognized service” and as the best platform to hold their educational credentials as they already apply for jobs directly on the website and are contacted by recruiters on the platform’s messaging system. To reiterate what one learner said, “[Employer] hasn’t heard of [eCampusOntario’s] Badge Passport, so LinkedIn adds legitimacy.” Learners feared that employers wouldn’t know how to view a virtual

wallet, or even ask to view it, but that they already know how to use LinkedIn.

Several learners expressed that they are invested in LinkedIn, with hundreds of connections, have found employment through the website, and pay for the premium features. Learners feared that a virtual wallet would be “just another app to do something that I already have.” With so many learners using LinkedIn for educational and professional purposes, the virtual wallet hinges on irrelevancy. A virtual wallet can and likely should be integrated with the LinkedIn platform as most learners are already using it to store educational credentials, connect with others, and seek employment.

Replace a Traditional Résumé and Current Hiring Practices

As one survey respondent said, “I would like to show potential employers, but I am unsure if employers know what a micro-credential is, or if they even care about seeing my digital credentials.” Learners suggested that they’re unsure if digital credentials or

a virtual wallet would be recognized by employers or integrated into hiring practices. In our focus group discussions of features like a QR code, learners if “employers want to see this,” and if employers “know how to access this?” One learner said, “When

you submit a résumé and a cover letter, it is read by a computer before a human reads it? Will the human scan the QR code or click the link to verify your credentials?" Clearly, these learners believe that industry lacks ways to verify credentials, and it will be hard to integrate into current hiring practices.

One focus group participant said, "What problem is this wallet solving? I have never been asked to provide proof of my bachelor's degree, let alone my micro-credential." This learner is not alone, as not a single focus group participant has ever been asked to provide proof of their micro-credential

for gaining employment. 13 of 41 (32%) focus group participants working in higher education (as instructors and professors) and regulated industries (teaching, accounting, and medicine) have had to produce degrees, certificates, and diplomas at some stage in their careers. This suggests that as current hiring practices stand as of this writing, employers are not asking learners to verify their credentials outside of regulated industries with governing bodies. While learners were optimistic to find uses for digital credentials and virtual wallets, they remain unsure if digital credentials or virtual wallets will be used for employment.

Longevity and Universality of a Virtual Wallet

Two other concerns that learners indicated was the longevity or "shelf-life" of an application, and the universal adoption of the virtual wallet platform. As data collected in the survey revealed, the majority of learners identified as traditional track students and were under the age of 35. This suggests that as many of these learners start their careers, they may require a virtual wallet to add professional development, reskilling, and upskilling credentials to over the course of their careers. One focus group learner asked: "How often will a virtual wallet be updated? Will it be supported for year? Or will it lay to the wayside after it's [been] used for a year?" A virtual wallet for digital credentials is a long-term investment, spanning the entire careers of traditional track learners, and will require consistent updates, patches, and feature modifications as the needs and norms of learners, employers, and postsecondary institutions change.

Secondly, many learners were concerned about the universality, or universal adoption, of a virtual

wallet platform across Canada and globally. Learners indicated that they have collected digital credentials from outside of Ontario and Canada, and would like a virtual wallet that holds all their educational credentials. If the same virtual wallet system is not adapted across Ontario postsecondary institutions, or even across Canada or internationally, this will require learners to have a series of virtual wallets for their educational credentials. This does not alleviate issues learners currently have with organizing and sharing their digital credentials. We also identified many international learners taking micro-credentials in Ontario, with 14 of our 41 focus group participants (34%) and 37 of 117 (32%) respondents to a question in our survey self-identifying as an international learner. Figures from 2019-2020 reveal that 33% of college students and 16% of university students in Ontario are international learners. A virtual wallet for digital credentials earned in Ontario needs to be recognized globally and integrated in some form with other international virtual wallet systems.

Conclusion

This project is the result of a survey of and focus group consultations with Ontario micro-credential learners. As we conducted a survey and focus groups, data on the demographics of this sample were presented and learner perceptions of existing digital wallets, how they foresee using a virtual wallet for digital credentials, the features learners expect in a virtual education wallet, how learners perceive security and ownership of credentials in a virtual wallet, required accessibility features, and why some learners do not approve of a virtual wallet for their education credentials were uncovered. Results can inform the development of a virtual wallet for digital educational credentials. Including learner voices in design is important to ensure that learners are able to access, use, and adopt a virtual wallet system.

Findings of this research indicate that those learners surveyed want a virtual wallet to store their digital credentials. However, consultations with employers will help to gauge how employers recognize digital credentials and if they want to verify credentials of potential employees. Consultations will also reveal how a virtual wallet can be integrated into existing hiring and onboarding practices. In our focus groups, one learner indicated that in their experiences, interviewers rarely ask about education; rather they “ask you to apply skills by answering scenario-based questions.” Consultations

with employers may also reveal if employers want to have proof that a learner has gained skills through micro-credential learning or if they want to see application of that skill in an interview environment. Employer engagement is needed to ascertain receptivity to digital credentials, micro-credentials, and the use of virtual wallets in addition or supplemental to C.V’s and résumés.

Overwhelmingly, micro-credential learners who participated in this research indicated that they want a virtual wallet; however, learners were specific about their needs, the features they require in a virtual wallet, their concerns against adapting a wallet, and how they intend to use a virtual wallet. Learners foresee using a virtual wallet for holding and tracking their educational credentials, gaining employment, and obtaining future education. Learners are looking for specific features in a virtual wallet which will enable the shareability and socialization of credentials, with data privacy, user security, and accessibility in mind.

While learners identified some concerns to widespread adoption of both digital credentials and virtual wallets, the development of virtual wallets for digital credentials will be greatly aided by including learners in the design, implementation, and adoption processes of such systems.

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Appendices

Appendix A: Survey Questions

Note: Not all survey respondents will see the same series of questions. Some questions serve as logic qualifiers that will display questions to select groups of respondents (for example those who currently use a virtual wallet)

Qualifying Questions:

1. Have you taken a micro-credential at a publicly-assisted Ontario Indigenous Institute, college, or university?
 - Yes
 - No
 - I'm Unsure (redirects to definition of micro-credential, and asks the question again)
2. Please select the institution (or collaborating institutions) that issued the latest micro-credential you completed:
 - List of Institutions + Other
3. Please select the discipline of the latest micro-credential you completed:
 - List of disciplines
4. What was issued to you upon completion of the requirements of the micro-credential(s)?
(Select All That Apply)
 - Digital Badge
 - Certificate (Paper)
 - Certificate (Virtual)
 - Diploma (Paper)
 - Diploma (Virtual)
 - Transcript Credit
 - Nothing
 - Other (Please State)
 - I choose not to answer

Learner Status:

5. Select a category which best reflects your current status as a learner?

- High School Graduate
- College Student
- Undergraduate Student
- Graduate Student
- Postdoc
- Upskilling/Professional Development
- Lifelong Learner
- Other [please type]:

6. Select a category that best reflects your status as a student?

- Domestic Student
- International Student
- I don't know
- I choose not to answer

7. How did you pay for your micro-credential? (Select all that apply)

- Ontario Student Assistance Program (OSAP)
- Out-of-pocket
- Employer paid (or portion of)
- Other (Specify)
- I don't know
- I choose not to answer

Learners and Digital Credentials:

8. Outside of micro-credentials, do you hold any digital copies of your educational credentials issued by an Ontario Indigenous Institute, college, or university (this includes any course, degree, diploma, or program)?

- Yes
- No
- Other (Please Explain)
- I don't know
- I have made my own (Photograph, Scan, PDF of Paper Copies)
- I choose not to answer

9. Other than micro-credentials, please select which digital copies of your educational credentials you hold. (Select all that apply)

- Advanced Certification
- Badge
- Certificate
- Degree
- Diploma
- Transcript
- Other (Please Explain)
- I choose not to answer

10. Do you hold a micro-credential from any issuer outside of a publicly-assisted Ontario Indigenous Institute, college, or university? (Select all that apply)

- No
- Private Indigenous Institute, College, or University in Ontario
- Publicly-Assisted Canadian (Not in Ontario) Indigenous Institute, College, or University
- Private Canadian (Not in Ontario) Indigenous Institute, College, or University
- Foreign (Not in Canada) Indigenous Institute, College, or University
- Google Digital Garage
- LinkedIn
- Coursera
- Brain Station
- Harvard Online
- Other (Please Explain)
- I choose not to answer

11. Would you like to have access to a virtual wallet to store your education credentials (this includes degrees, diplomas, certificates)?

- Yes
- No
- Other (Please Explain)
- I choose not to answer

12. Would you like to have access to a virtual wallet (also called a micro-credential portfolio or passport) specifically to store your micro-credential(s)?

- Yes
- Yes, I already use one (Such as eCampus Ontario's Badge Passport)
- No
- Other (Please Explain)
- I choose not to answer

13. Which scenarios do you foresee the need for having a digital copy of your micro-credential? (Select all that apply)

- Gaining employment (Job Applications/CV/LinkedIn)
- Enrolling in further education (In addition to transcripts from institutions)
- Professional development (To Show Your Employer)
- Other (Please Explain)
- I choose not to answer

Virtual Wallet Technology:

14. Do you currently use any virtual wallet systems outside of an educational context (such as Apple Wallet, Google Pay, Samsung Pay, Android Pay etc.)?

- Yes
- No
- I don't know
- Other (Please Explain)
- I choose not to answer

15. Which virtual wallet(s) do you use? (Select all that apply)

- Ali Pay
- Android Pay
- Apple Wallet
- Fitbit Pay
- Garmin Pay
- Google Pay
- Meta (Facebook) Pay
- Microsoft Pay
- PayPal
- Samsung Pay
- Other (Please Specify)
- I choose not to answer

16. What do you currently store in a virtual wallet? (Select all that apply)

- Bank Cards
- Currency
- Credit Cards
- Gift Cards
- Identity Card (Driver's License)
- Membership Card
- Student Identification Card
- Other (Please Specify)
- I don't use a virtual wallet
- I choose not to answer

17. Please rate your personal feelings towards the following aspects of virtual wallets, using a five-point scale of importance, where 5 means very important to me and 1 means not at all important to me.

- a. Reliable
- b. Trustworthy
- c. Protects My Information

18. Would you be interested in holding your micro-credential(s) in an existing virtual wallet such as Apple Wallet, Google Pay, Samsung Pay, or Android Pay?

- Yes
- No
- I already hold my micro-credential(s) in a virtual wallet
- I don't know
- I choose not to answer

19. How would you prefer to access a micro-credential virtual wallet? Please select which statement best aligns with your opinion.

- Stand Alone Mobile App
- Stand Alone Website
- Integrated into existing digital wallet applications (Apple Pay, Google Pay etc.)
- I do not want access to a micro-credential digital wallet
- Other (Please Explain)
- I choose not to answer

20. Please describe how you might use a micro-credential in a virtual wallet:

21. Please select all the features you would like to see in a virtual credential wallet.

- Ability to share credentials as QR Codes
- Ability to securely share your credentials with employers
- Analytics dashboard (including features the suggestion of other micro-credentials for further learning, list of other micro-credentials in the same field of study, how many users have taken the same course)
- Cloud-based
- Community (connect with other learners who have taken the same course)
- Integrated with social media platforms (LinkedIn, Twitter etc.)
- Integration with Learning Platforms (Blackboard, Brightspace, Canvas, Moodle, Institution-specific etc.)
- Integration with Job Boards
- Integration with Job Listings specifically for learners who have completed specific micro-credentials
- Interactive and Smooth Design
- Live translation (convert all credentials to any language)
- Secured on a blockchain system
- Self-registration
- Two-factor authentication
- Wearable device integration
- Other (Please Explain)
- I do not want a digital credential wallet
- I choose not to answer

Virtual Wallet Security and Consent:

22. Please answer the following question using a five-point scale to rate your level of comfortability, where 5 means very comfortable and 1 means not at all comfortable. If micro-credentials were available in a virtual wallet, rate your level of comfortability sharing them with:

- a. Potential Employers
- b. Current Employers
- c. College/University Administrators
- d. College/University Professors
- e. Learners who took the same micro-credential
- f. Accessible to anyone

23. Please select the option you most prefer:

- a. You have direct control over your virtual credential wallet (for example, you request badges from the issuing institution to be added to your wallet)
- b. A centralized repository which holds all your digital credentials and directly adds them to your virtual credential wallet
- c. I choose not to answer

24. Would you be comfortable granting the micro-credential issuer (a publicly-assisted Ontario Indigenous Institute, college, or university) access to modify your micro-credential in a wallet after it is issued? This may include adding endorsements, updating the skills learned, to change your name.

- Yes
- No
- I don't know
- I choose not to answer

25. Do you foresee any barriers to your ability to use a virtual credential wallet? Select all that apply:

- Ownership of a mobile device
- Space an app or wallet would occupy on a mobile device
- Highspeed internet or mobile data required to use a digital wallet
- Other (Please Specify)
- None
- I choose not to answer

26. Would you be willing to pay to have access to a credential virtual wallet?

- Yes, I would be willing to pay
- No, the digital wallet should be free
- I don't know
- I choose not to answer

Education and Career Goals:

27. Did you take a micro-credential for the purpose of gaining employment, upgrading your skills for work, or entry into further education?

- Yes
- No (Please Explain)
- I don't know
- I choose not to answer

28. Do you think that showcasing your micro-credential on a resumé, CV, or on a professional development tracker helped you gain employment, a promotion, a raise, or other favorable employment status?

- Yes
- No
- I don't know
- I did not share my micro-credential with my current or potential employer
- I took a micro-credential for entry into further education, not for employment
- I choose not to answer

Optional Demographics Questions:

29. Which age group do you belong to?
30. What is your current employment status?
31. Which postsecondary institution do you attend?
32. Which industry best reflects your current employment?

Compensation/Further Research Questions:

33. Thank you for participating in this survey, you are eligible to enter a draw for 1 of 10 prizes of \$50. If you would like to enter the draw, please enter your email.
34. We are interested in following up on the results of this survey with virtual focus groups. Focus groups are expected to take 1.5 hours, and you will be compensated with \$100. If you are interested in participating in this interview, please provide your email here for us to follow-up with you!

Appendix B: Focus Group Questions

The following is a guideline of questions that may be asked in focus group sessions; however, the research team may modify line of questioning based on how respondents answer questions:

Micro-credentials:

- In your own words explain what a micro-credential is, and the kind of features it has. How does it differ from a traditional course?
- Did the micro-credential assist in your career or educational goals?
- How do you demonstrate that you learned from a micro-credential? Do you show the badge? List it on a CV? List in Professional Development trackers?

Digital Wallets Learner Use:

- Are you a digital wallet user?
 - > If they say yes- Is there a convenience to using a wallet?
- Why did you choose or not choose to use a wallet?
- Do you think that educational credentials have a place in your digital wallet?
 - > Why or Why Not?
- Have you ever needed to produce educational credentials outside of educational endeavors (such as applying for a job, immigration purposes etc.)

Technological Infrastructure:

- What does personal ownership and authority over your educational credentials look like to you?
- What does this look like? What security features would you like to see?
- Ability to include and exclude different features (grade, learning outcomes, endorsements?)

Accessibility:

- Would you want to be able to share your micro-credential with someone?
 - > Who? What scenarios?
- Are there any technological constraints you foresee to having a digital credential wallet?
 - > Such as old operating systems, storage space, data/internet requirements, security fears?
 - > Cost associated with a digital wallet?
- Would or wouldn't you pay for access to this service?
 - > Why or Why Not?
 - > How long would you pay for access to this service?



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