Identifying Key Skills For The Future Of Work And The Assessments To Build Them

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*Review articles are papers that provide a balanced synopsis of the current literature within a specific area of inquiry. These papers summarize the literature comprehensively and also identify outstanding questions and areas for future inquiry.

Abstract

Identifying skills for the future of work and how assessment design and implementation can help support the building of these skills are necessary to support learners in this era of technological disruption. The acceleration of various forms of disruptive technologies, from automation and the expansion of artificial intelligence, the increasing embeddedness of remote collaboration and communication technologies, and the expansion of the gig economy, are rapidly transforming the interconnected realities of work and learning. As such, the article sets to do the following: (1) identify key skills, mindsets and knowledge required to succeed in the future of work; (2) assess various technological, economic and other factors that are transforming the landscape of work and learning; (3) explore the role of curriculum and instructional design, particularly community-engaged learning, in creating opportunities for learners to develop and practice key skills, mindsets and knowledge; and (4) explain how post-secondary institutions, including polytechnics, are ideal sites for a more robust alignment of skill development and assessment design.

Introduction

Human skills, often called 'soft' skills, are needed to thrive in an era of technological disruption, and employers regularly report them as insufficiently developed in new employees (Ahmad, 2020; Flores, 2020; Soffel, 2016; Wilson and Daugherty, 2018). Human skills include communication and collaboration, analytical thinking, creative thinking, and digital and technological literacies, among others. Drawing from research into the interface of human skills and the future of work and learning, forces that are transforming the future of work and learning, including the fissuring of the employer-employee relationship, the detachment of work and learning from fixed geographic locales, and how artificial intelligence and automation are encroaching on knowledge work, are considered (European Commission, 2018; Katz and Kreuger, 2019; van der Elst, 2019). In this unfolding ecosystem, where traditional forms of knowledge development are being disrupted, the argument can be made that the design and delivery of instruction and assessment need to be reimagined. Digital and other technologies can be

leveraged to interface with legacy learning environments alongside deepening community-engaged learning to create experiential and immersive learning environments that allow learners the opportunity to develop and practice future-ready skills and mindsets (Jeong, 2020; Jha et al., 2022; Katiyar et al., 2024; Morton et al., 2023). Post-secondary institutions, including polytechnics, which have experience in implementing work-integrated and experiential learning, are well-situated to continue these initiatives (Polytechnics Canada, nd).

(1) Identify key skills, mindsets and knowledge required to succeed in the future of work

Researchers, advisors, and futurists vary in their inventory of the key skills, mindsets and knowledge that are required to succeed in the future of work; however, one place to start is with the World Economic Forum. In 2016, as part of their list of the 16 skills, the World Economic Forum included six "foundational literacies" (literacy, numeracy, scientific literacy, financial literacy, cultural and civic literacy and literacy in information and communication technology); four "competencies" (collaboration, creativity, communication and critical thinking/problem solving) and six character traits or aptitudes, which include curiosity, initiative, perseverance, adaptability, leadership, and social and cultural awareness (Soffel, 2016). In 2023, the World Economic Forum listed the following as the top 10 skills in demand: (1) analytical thinking; (2) creative thinking; (3) resilience, flexibility and agility; (4) motivation and self-awareness; (5) curiosity and lifelong learning; (6) technological literacy; (7) dependability and attention to detail; (8) empathy and active listening; (9) leadership and social influence: and (10) quality control (World Economic Forum, 2023). As such, notable in this list is a combination of key skills (analytical thinking, creative thinking, active listening) with mindsets (such as curiosity, resilience, flexibility, motivation, and attention to detail) combined with knowledge such as technological literacy and quality control. Rios et al. (2020) scanned approximately 142,000 job ads and determined that the most frequent skills desired by employers are oral communication, written communication, collaboration, and problem-solving, while Thornhill-Miller et al. (2023) identified the "4Cs": creativity, communication, critical thinking, and collaboration. Yet, beyond the experts at the World Economic Forum, there are

other researchers (Delisle & Lajoie, 2022; Succi & Canovi, 2019; Klein & Walton, 2024; Teng et al., 2019; Vista, 2020; Ward et al., 2021) who offer their own inventories and assessments of vital skills for the future of work, variously called soft skills, 21st -century (C21) skills. Table 1 groups these respective skills, arranged in alphabetical order, and identifies the researchers on whose inventories they appear. No one list matches another. However, in terms of patterns, 10 skills are found on the lists of three or more inventories. These 10 skills are (in alphabetical order): **collaboration, communication, creativity and innovation, critical thinking, cross-cultural competency, decision-making and judgment, learning/willingness to learn, problem solving, and social intelligence/perceptiveness**[1]. Succi and Canovi (2019) compared Italian and German managers and students, noting that "employers consider more important the skills of *Being professionally ethical, Adaptability to change, Creativity and Innovation, Customer/user orientation and Teamwork, while students consider more important Contact network and Conflict management* skills" (italics in the original, p. 1844). Within an Australian context, Klein and Wilton (2024) map 11 skills for the future in the context of the BA (Bachelor of Arts) program. Teng et al. (2019) surveyed Chinese and Malaysian students' impressions of employability and work readiness related to soft skill acquisition, using the 15-item Goldsmiths soft skill inventory of 15 capabilities (p. 593 in Chamorro-Premuzic et al., 2010). Ward et al. (2021) deploy a 21st century (C21) skills taxonomy to address what they call a "capability-competency chasm," which is "a gap between the capabilities learnt within a qualification, as stated in terms of learning outcomes, and the competencies required of job roles as listed in job specifications" (p. 346). Ward et al. (2021) seek to align C21 skills with a range of English HE degree programs, including Engineering, Computing, Accountancy, Marketing, Psychology, Law, and Languages, that are accredited by a range of professional bodies. Vista (2020) uses American O*NET data from the US National Center for O*NET Development (2019) to define and describe 10 (ten) skills, which are then measured against three occupational clusters: Architecture and Engineering; Social Sciences; and Production, with the tenth skill varied depending on the occupational cluster.

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[1] Importantly, these lists are drawn from research involving internationally varied participants and were conducted with different research goals in mind.

Table 1: Skills Inventory

Skills	Delisle & Lajoie, 2022	Klein & Walton, 2024	Succi and Canovi, 2019	Teng et al, 2019	Viista, 2020	Ward et al, 2021
(Active) listening	✓					
Adaptability to change; Flexibility						✓
Analysis			✓			
Attention to details				✓		
Civil literacy						✓
Cognitive load management		✓				
Collaboration	✓	✓				✓
Committed to work			✓			
Communication	✓		✓	✓		✓
Computational thinking		✓				
Conflict management and negotiation (political skills)	✓		✓			✓
Contact network			✓			
Continuous improvement			✓			
Coordination	✓					
Creativity and innovation	✓		✓			✓
Critical thinking	✓			✓	✓	✓
Cross-cultural competency/Cultural adaptability		✓	✓			✓
Curiosity	✓					
Customer/user orientation			✓			
Decision-making and Judgment	✓		✓		✓	✓
Design mindset		✓				
Emotional intelligence	✓			✓		
Environmental literacy						✓
Financial, business, economic and entrepreneurial						✓

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Skills	Delisle & Lajoie, 2022	Klein & Walton, 2024	Succi and Canovi, 2019	Teng et al, 2019	Viista, 2020	Ward et al, 2021
Flexibility of closure					✓	
Fluency of ideas	✓				✓	
Global awareness						✓
Grit/perseverance	✓					
Health literacy						✓
Imagination				✓		
Information literacy, ICT literacy, new media literacy		✓				✓
Initiative and self-direction; self-efficacy	✓					✓
Insight				✓		
Instructing	✓					
Interpersonal				✓		
Leadership			✓			✓
Learning/willingness to learn/learning strategies	✓		✓	✓		
Life balance			✓			
Management			✓			
Maturity				✓		
Metacognition	✓					
Novel and adaptive thinking		✓				
Planning				✓		
Problem sensitivity (identification)					✓	
Problem solving (general mental ability)	✓				✓	✓
Productivity and accountability						✓
Professionalism				✓		
Professionally ethical			✓			
Responsibility				✓		✓
Results orientation			✓			
Self-awareness			✓			

Skills	Delisle & Lajoie, 2022	Klein & Walton, 2024	Succi and Canovi, 2019	Teng et al, 2019	Viista, 2020	Ward et al, 2021
Self-management				✓		
Sense making		✓				
Service orientation	✓					
Social intelligence; social perceptiveness	✓	✓			✓	✓
Teamwork			✓	✓		
Tolerant to stress			✓			
Transdisciplinary		✓				
Virtual collaboration		✓				
Visualization					✓	
Working under pressure				✓		

Building on a data-driven approach, other researchers are concerned about identifying the specific skills that have a positive impact on job performance and the evidence to support them. To this end, Delisle and Lajoie (2022) focus on determining the relationship between skills and job performance, with attention to the Canadian public sector. They argue that while there are various theories about future skills, there are only a few skills which have a positive correlation between the development and application of the skill and a significant positive impact on job performance. Delisle and Lajoie (2022) surveyed a variety of "future of skills" reports and adopted O*NET definitions (National Center for O*Net Development, 2019) to analyze 20 skills. Notably, there were two skills that displayed the strongest correlations with job performance: problem-solving or general mental ability and creativity (p. 159-160).

While these studies offer directional guidance gleaned from different international contexts, a few, such as that by Brasse et al. (2023), suggest focusing on a key industry and region in elucidating the specific skills needed for the future of work; in their case, the manufacturing industry in Baden-Wuerttemberg, Germany. Using a methodology that examines some 1.2 million job advertisements to extract information about key future skills, Brasse et al. (2023) identify four skills clusters that they argue are in relative demand by regional employers. These are grouped as: (a) technological skills, such as cybersecurity, data science, IT-infrastructure and software; (b) industrial skills, such as those related to biotechnology, pharmaceutical development, electrical and industrial engineering; (c) digital skills, such as digital collaboration, programming skills and "basic IT skills," (p. 488); and (d) "generic skills," which included creativity, leadership, initiative and organizational skills. Importantly, Brasse et al. (2023) find that the top two skills across in relative demand, as evinced by job advertisements and in consultation with expert advisors, are the generic skills of organization and initiative. Brasse et al. (2023) assemble a list of crucial skills that interconnect technological, digital, industrial, and soft/social skills. This is similar to Flores et al.'s (2020) model of worker competency development that included five dimensions: (a) self-awareness, including emotional intelligence; (b) cognitive functioning; (c) 'soft' or social skills, such as interpersonal, communication and collaboration skills; (d) 'hard' or technical skills related to job performance; and (e) digital skills. The combination of human social skills with technical skills and digital skills reflects Ahmad's (2020) discussion of fusion skills, which leverages notions of collaboration and complementarity between humans and AI (Hemmer et al., 2024; Wilson and Daugherty, 2018).

(2) Assess various technological, economic, and other factors that are transforming the landscape of work and learning

Current scholarly attention on analyzing the future of work and learning skills centres on generative AI's disruptive and transformative impacts. As Bankins et al. (2024) summarize, the disruption of AI in the workplace, like technology more generally, involves three "channels": (1) replacing aspects of human work; (2) complementing or augmenting human workers and their skills; and (3) creating new tasks for workers. While the replacement channels describe how organizations are implementing AI to automate routinized tasks, the complementary channel offers the possibility of human-AI collaboration or symbiosis to generate new insights through AI's capabilities to process vast amounts of data, discern patterns and form predictions. However, harnessing this prospect also necessitates worker trust in AI at a time when there is anxiety about both job loss due to AI implementation and co-existence with it (Zirar et al., 2023). At the same time, the social and economic arrangements around work are changing with the growth of precarious employment, the "gig economy", and "alternative work arrangements" (Katz and Kreuger, 2019), where an "unbundling" of skills and tasks occur (van der Elst, 2019; European Commission, 2018). Moreover, advanced knowledge/service/technologically led economies are reorganizing to produce a "polarization of job opportunities (Autor, 2010), where routinized tasks are increasingly automated and robotized, and the highest-paid managerial and organizational work is harder to automate. Flores et al. (2020) identify other key challenges, including an aging population across the globe, social and health well-being, VUCA (Volatility, Uncertainty, Complexity and Ambiguity) and the impacts of climate change and resource utilization.

In their exploration of workers' psychological needs and the constructs of self-determination theory, Gagné et al. (2022) discuss several factors in characterizing the future workplace, focusing on uncertainty and interdependence. As Gagné et al. (2022) describe, "[h]igher levels of uncertainty require more adaptive behaviours, whereas higher levels of interdependence require more social, team-oriented and network-oriented behaviours" (p. 379). The higher levels of uncertainty are a direct result of the advancement of disruptive technologies and globalization, as well as the exacerbation of inequalities due to gender, the digital divide,

and generational differences in technology-related skills. Elaborating on how self-determination theory can impact the psychological needs for competence, autonomy and relatedness, Gagné et al. (2022) write that "under conditions of uncertainty, individuals will benefit from showing cognitive flexibility, creativity, and proactivity, all behaviours that are more likely to emerge when people have self-determined motivation" (p. 380).

Illustrative of the rapidly changing dynamics of uncertainty and independence are the disruptive factors that impact sense-making. "Sense-making is the process by which we gather and interpret information to give meaning to our world, make decisions, and take action" (Policy Horizons Canada, 2024, p. 6). Policy Horizons Canada (2024) identifies seven forces that are challenging our ability to make sense of the world around us: "intensifying social surveillance, quantification and sorting; pervasive mis/disinformation; more and more powerful AI; less hospitable natural environments; convergence of the digital and physical; revision of shared narratives; and displacement of traditional knowledge authorities" (p. 11). Within this emergent context, supporting the development of skills such as critical-thinking, problem-solving, social intelligence, collaboration, and communication within a mindset of negotiating uncertainty and independence and the forces that challenge sense-making becomes even more salient for crafting responsive learning environments and assessment modalities, to which we now turn.

(3) The Role of Curriculum and Instructional Design in Skill Development

If employers and students agree that the benefit of polytechnic education is that learners are afforded the opportunity to develop and practice hands-on skills, students should also be prepared for changes that are occurring in the workplace. Curriculum and instructional design are pivotal in empowering learners with the necessary skills, mindsets, and knowledge to thrive in a rapidly evolving landscape. As technology disrupts traditional educational paradigms, educators are not just required but also capable of integrating these tools into their curricula to foster essential skills like digital literacy, problem-solving, and adaptability. By aligning technology with learning objectives, educators are not only enhancing educational outcomes but also preparing students for the complexities of modern work environments. This alignment of technology includes the utilization of innovative in-class augmentative tools such as Plickers™, Kahoot!™, Miro™, and Kialo™, as

well as effective asynchronous modalities for independent and online learning like H5P™, Kialo™, Miro™, and Padlet™. Their effective use can increase student engagement and knowledge retention.

Innovative assessment design is necessary in the context of the changing post-secondary learning environment. Offering opportunities for learners to engage in formative assessments that provide continuous feedback and real-time evaluation reinforces the relevance of learning objectives and allows students to authentically demonstrate their growing skills in formats applicable to future workplaces. Gikandi, Morrow, and Davis (2011) highlight the effectiveness of online formative assessments in higher education, noting their potential to improve student engagement and learning outcomes. Furthermore, Siemens (2005) discusses the shift towards networked learning, emphasizing the need for curricula that support collaborative and experiential learning, enabling students to develop critical skills through interconnected digital platforms.

The changing nature of work, particularly the rise of the gig economy, urgently demands flexible educational programs that can adapt to these new realities. Agostinho, Bennett, and Lockyer (2011) stress that future learning design should focus on personalized and modular learning experiences, which can be tailored to individual needs and career paths. This emphasis on personalization and modularity highlights the need for educational programs to respond to the changing nature of work. Additionally, Boud and Falchikov (2007) advocate for assessment practices that prepare students for lifelong learning, ensuring they can continuously adapt to new career challenges and opportunities.

The integration of technology within curriculum and instructional design is pivotal in enhancing educational outcomes. Emerging technologies such as artificial intelligence (AI), machine learning, and automation are increasingly being incorporated into educational curricula to revolutionize learning experiences (Katiyar, et al., 2024). By aligning these technologies with learning objectives, educators can tailor instruction to individual students' needs, abilities, and learning styles, thereby personalizing the learning process (Katiyar, et al., 2024). This personalized approach not only enhances engagement but also ensures that students receive targeted support to develop key skills, mindsets, and knowledge.

Remote collaboration and communication skills are vital in today's interconnected world. The shift to remote learning highlighted the importance of designing curricula that promote effective virtual teamwork and communication (Jha et al., 2022). Best practices in curriculum design should emphasize opportunities for students to engage in collaborative projects, virtual discussions, and interactive activities that mirror real-world remote work environments (Jha et al., 2022). By providing students with experiences that require them to communicate effectively, collaborate with peers across distances, and leverage digital tools for teamwork, educators can prepare learners for success in a globalized, digitally driven society.

Curricula must focus on developing critical skills and mindsets essential for success in the modern world. Skills like digital literacy, adaptability, and creativity are increasingly important in the face of rapid technological advancements and changing job markets (Jeong, 2020). Instructional design plays a crucial role in fostering these skills through experiential learning and interactive content that engage students in hands-on activities and real-world problem-solving scenarios (Jeong, 2020). By immersing students in practical experiences that require them to think critically, collaborate, and innovate, instructional design effectively cultivates the key skills and mindsets needed for success in the 21st century.

It is important to note that institutions are beginning to recognize the importance of future-focused curricula as a tenet of student success. For example, York University's Glendon College (Glendon's New Core Curriculum Provides Foundation for Students' Future Success, 2024) and the University of Waterloo (n.d.) have developed frameworks to recognize these skills. Through these frameworks, institutions recognize the need to outline that their approach to learning aims to ensure that, upon graduation, students will have not only knowledge but skills to ensure success in the changing workforce. Given the increased recognition of the value of these skills, developing a national framework which recognizes research-backed approaches to curriculum design and assessment that will position Canadian students at the forefront of the digital employment landscape is needed. A strength of the polytechnic approach is that it relies not only on classroom-based instruction and assessment but also on the workplace and the community at large.

Another effective approach to integrating these critical skills is through community-engaged learning, and while not new to higher education, its value is increasingly relevant given the acceleration of disruptive technologies. Community-engaged learning (CEL) is broadly defined as collaboration between institutions of higher education and their larger communities for the purpose of mutually beneficial exchange of knowledge and resources in the context of partnership and reciprocity (Carnegie Foundation, n.d.). It incorporates a variety of pedagogies, such as experiential education to connect theory taught in the classroom with real-world practice (Kendall et al., 1986), service learning whereby community service or practicums are used to enhance student learning with direct ties to academic content (Chupp and Joseph, 2010; LaFrombois and Mittal, 2024), and community-engaged research (CEnR) that involves community members in the research process to address locally identified issues (Preston, 2022). Importantly, CEL meaningfully integrates community engagement and curricular programming with course learning outcomes and community-identified needs (Morton et al., 2023).

The outcomes of CEL have been substantial across student learning as well as community and instructor benefits. There are both academic and civic outcomes for students while creating meaningful contributions to communities through reciprocal partnerships (Carnegie Foundation, n.d.). While student learning is central, CEL moves beyond a focus on academics to include benefits for the larger community (Welch and Plaxton-Moore, 2019). In this sense, students learn how to translate classroom learnings to practical situations while developing or reinforcing a service ethic and a sense of social justice (LaFrombois and Mittal, 2024). Furthermore, students benefit by being brought into meaningful contact with future employers, achieving higher levels of engagement with and retention of course materials, developing a deeper understanding of community priorities, issues, and systems, as well as improving critical-thinking, problem-solving, presentation, analytical, teamwork, and interpersonal skills (University of Guelph Community Engaged Scholarship Institute, 2023). For the community, CEL provides opportunities to engage learners and grow beneficial community relationships, prepare students to serve as educated and engaged citizens, and receive mutually beneficial outputs from student assignments. Concerning instructors, CEL offers a creative pedagogy that fosters links between theory and practice, which can

enhance student engagement and motivation in course materials, foster an interactive classroom atmosphere in which students' voices are valued, and cultivate or strengthen community collaborations (Preston et al., n.d).

Unlike traditional classroom assessment, CEL requires instructors to focus on reciprocal and authentic relationships that prioritize community partners as co-educators (Welch and Plaxton-Moore, 2019). According to Welch and Plaxton-Moore (2019), the foci of community-engaged pedagogy may focus on civic engagement, disciplinary criteria, project-specific objectives, or research aims. Concerning civic-focused service learning, course content is selected to develop students' civic knowledge, skills, and behaviours. In such instances, students learn about civic processes and democratic participation while also participating in community organizations off campus. A focus on disciplinary CEL occurs when an instructor selects a community partner with the aim of providing experiences for students that directly relate to course concepts and theories, while research-focused pedagogy aims to engage community members as researchers in collaboration with students to define research questions, collect and analyze data, and disseminate findings in ways that advance social change. In the concluding section, we will discuss how polytechnic institutions are ideal areas for skill development and assessment design.

(4) Polytechnic institutions—ideal sites for skill development and assessment design

While it may appear obvious to some, it is nonetheless worth explicitly repeating Polytechnics Canada's definition of polytechnic education:

> "[P]olytechnics are post-secondary institutions that offer advanced technical education. The polytechnic model is hands-on and industry-responsive. Programs encourage learning by doing, developing the practical skills and competencies required in today's workplaces and giving our graduates a leg-up in the labour market." (Polytechnics Canada, n.d.)

Employers are questioning whether credentials represent the skills they need in their organizations (Komesch & Watts-Rynard, 2021), despite the polytechnic's responsiveness to industry needs in their curriculum. While polytechnics do train graduates to competency, they are also well-positioned

to develop graduates' capabilities by calibrating teaching and learning through meaningful assessments with the competencies and capabilities that employers are seeking. Competencies generally refer to fundamental skills and knowledge that are necessary for successfully performing specific tasks. Capabilities reflect the development of one's personal, interpersonal, and cognitive capabilities. These capabilities enhance one's discernment of complex and consistently shifting human and technical contexts of practice in the real world and the capability to select an appropriate response (Fullan & Scott, 2014). Here, learning goes beyond skills acquisition in isolation relative to context.

Polytechnics are well-positioned for skills training for specific tasks or contexts, but they are also primed for collaborative learning between educational institutions, industry partners, and student learners who are motivated to be career-ready. The future of work will increasingly need this type of collaborative learning for calibration between the three stakeholders, and the educational institution will need to integrate more focus on capabilities that develop "an attitude of mind, a set of values and the personal, interpersonal and cognitive capabilities" (Fullan & Scott, 2014, p.4). These capabilities are represented in Fullan and Scott's (2014) immersive six Cs: Character, citizenship, collaboration, communication, creativity, and critical thinking. These capabilities are immersive in that they cannot be developed in a vacuum for full effective use in society or, more specifically, the workplace. Much of the development of these capabilities will require learning by doing and reflection for deep learning. This is reflected in Kolb's Experiential Learning Theory (Kolb et al., 2001) for the learner to make sense of their educational experiences, not merely experience the experience. By making sense of their experiences, the learner can potentially develop their Character (e.g., resilience in the face of adversity and change), Citizenship (e.g., synthesizing diverse values to solve complex problems), Collaboration (e.g., interpersonal and team skills for reciprocal learning with others), Communication (e.g., appropriate use of digital, writing, and speaking skills for different audiences), Creativity (e.g., asking questions to generate divergent or novel ideas),

and Critical Thinking (e.g., critical evaluation of different sources of information to arrive at a well-rationalized and supported position).

Polytechnics are also well-positioned in the higher education landscape for enhancing graduates' career readiness through their articulation of pathways between college diplomas and degree programs. Such degree programs have often been degree-granting university institutions and have more recently included degree-granting polytechnic institutions. Therefore, there is an opportunity for innovative universities and polytechnics to further develop articulation agreements as higher education institutions continuously navigate fiduciary responsibilities[2]. What we think is needed is greater collaboration between (1) educational institutions to enhance the value proposition of polytechnic education and higher education at large, and (2) higher education institutions and industry partners. On the first point, such collaborations should include polytechnic education institutions and universities working together as they all continue to face similar challenges with restrictive budgets, declining numbers of age-appropriate individuals seeking further education after high school and increasing costs. College degrees can enhance their curriculum with a focus on developing competencies and capabilities, and university degrees need to integrate more authenticity in their assessments so that the experiences and reflection on experiences underway in university curricula better prepare graduates for a wide array of careers.

On the second point, we understand that polytechnics tend to have program advisory councils that include the perspectives of employers. We believe that it is necessary to also continuously work with prospective partners by leveraging existing resources through higher education offices dedicated to work-integrated learning (or co-op education). Specifically, polytechnics can utilize their inherent proficiency for applied research (in collaboration with their research offices) by working together with providers of co-op experiences to students on applied research while working together to identify the key skills that graduates

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2   The University of Guelph-Humber in Ontario, Canada, offers a unique approach by fully integrating the strengths of university and polytechnic education in its curricula. The dual credential of a university degree from the University of Guelph and college diploma from Humber Polytechnic is valuable for employers and graduates. However, this value is arguably dimmed by assessments that do not adequately prepare students with requisite knowledge and skills, in technical human domains (i.e., soft, transferable, 21st century skills) (Garcia-Aracil et al., 2018).In addition, Humber Polytechnic, also in Ontario, Canada, has a longstanding tradition of work-integrated learning that provides students much-needed opportunities to enhance their career prospects with the means of learning critical employability skills.

need to be prepared for the workplace. In identifying these key skills, through planned data collection and informal conversations, the polytechnic administrators and educators can change their curricula and assessments of learning to better reflect the mindset, skills, and knowledge that are needed for better career preparedness and readiness. Moreover, students can be encouraged to actively engage in this initiative through deep and critical reflection on their experiences and showcasing their learning through the development of portfolios to display and reflect on their learning journeys, as well as their application to potential future work.

Polytechnics, universities, employers, and students will all play a critical role in determining workplace success as they continuously adapt to changes in society. This adaptation will need all stakeholders to be proactively responsive, which will require the necessary capabilities to address re-skilling and up-skilling needs and the capabilities of the individual graduate to have the requisite mindset, skills, and knowledge for the future of work (Kolade & Owoseni, 2022). These capabilities will differentiate the more successful graduates as knowledge work and skills reflect societal demands for novel solutions to old and new problems. For further reading, we highly recommend readers refer to the collection of essays compiled by Humber Press, "Polytechnic Education: A Vision for Ontario" (Humber Press, 2021). With character, citizenship, collaboration, communication, creativity, and critical thinking, we can establish the aims, put into effect the actions, and assess the outcomes of our efforts with industry partners and students to be prepared for the work of the future and the future of work.

Conclusion

The skills that most frequently appeared in future of work skills inventories include collaboration, communication, creativity and innovation, critical thinking, cross-cultural competency, decision-making and judgment, learning/willingness to learn, problem-solving, and social intelligence/perceptiveness. There is no agreement in the literature on what future work skills are and variability in how skills are named, from soft/social skills to human skills to 21st-century skills. However, with a focus on examining research that included international contexts, both student and employer perceptions, and qualitative and quantitative approaches, and set within a context of technological disruption and workplace transformation, these skills were the most noted.

The development of these skills within the evolving context of curriculum and assessment design, with a specific focus on community-engaged learning, was explored. With rapidly evolving technology, flexibility in educational programs is essential to adapt to the new realities with opportunities to collaborate with peers, practice communicating effectively across different modes, and work with community partners to learn about real-world, timely challenges. Polytechnic institutions are a natural fit for fostering this type of learning as they are industry-responsive and emphasize hands-on learning, making graduates more competitive and ready for the labour market.

In terms of outstanding questions and areas for future inquiry, several areas emerge. One area is to explore how various post-secondary assessments, such as case studies, simulations, multimedia blogs, essays, quizzes, group discussions, debates, and community-engaged learning, support the development of future of work skills. A second related area is how post-secondary institutions are devising and implementing course outlines and curricular guidelines to support the development and performance of future of work skills. Third, future research should explore how assessment tools or strategies can be implemented within specific disciplines as well as across an institution. It remains unclear, for instance, how assessments that are specific to one program's learning outcomes in the social sciences may align with assessment practices in a discipline of applied sciences. Fourth, given the salience of future of work skills to a core purpose of polytechnic education, namely, equipping learners with the skills to thrive in future careers, attention to developing clearer frameworks to identify and develop key future of work skills is needed. In fact, we would argue that, in the Canadian context, a national future of work skills framework ought to be developed to provide guidance and clarity to higher education institutions, instructors, educational developers, learners, and employers.

By synthesizing academic literature on key skill sets, this review offers insights into pedagogical practices that support future of work skills, contributing to the scholarship of teaching and learning. Continued engagement and self-reflection when adapting educational practices to prepare students for success in both academic and practical contexts is important, especially in this era marked by disruptive technologies that are reshaping the landscape of teaching and learning. Such degree programs have

traditionally been offered by universities and more recently by degree-granting polytechnic institutions.

Conflict of Interest

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Note on Contributors

Dr. Nitin Deckha was recently Interim Associate Head, Liberal Studies at the University of Guelph-Humber. Nitin has taught courses in intercultural competence, social problems, transition to work, public policy, gender issues and other topics. He has conducted learning sessions in leadership, the future of work and equity and inclusion. His recent research has focused on police and higher education.

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