SKILLSNEXT

Technology-Enabled Innovations in the Skills and Employment Ecosystem

NOVEMBER 2020

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Wendy Cukier, Mark Patterson,
and Karen E. McCallum

PUBLIC POLICY FORUM

TED ROGERS SCHOOL OF MANAGEMENT | DIVERSITY INSTITUTE

Future Skills Centre

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This report is available online: English | French

ISBN: 978-1-77452-022-2

Skills Next is funded by the Government of Canada's Future Skills Program.

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ABOUT THE PROJECT

Canadians' needs for skills training are changing rapidly. Through Skills Next, the Public Policy Forum and the Diversity Institute—in its role as a research lead for the Future Skills Centre—are publishing a series of reports that explore a number of the most important issues currently impacting the skills ecosystem in Canada. Each report focuses on one issue, reviews the existing state of knowledge on this topic, and identifies areas in need of additional research. This strong foundation is intended to help support further research and strengthen policymaking. A diverse set of authors who are engaged in the skills ecosystem through various roles, including through research, activism and policymaking, have been carefully selected to provide a broad range of perspectives while also foregrounding the Canadian context. Their varied backgrounds, experiences and expertise have shaped their individual perspectives, their analyses of the current skills ecosystem, and the reports they have authored.

MAJOR THEMES EXPLORED IN SKILLS NEXT INCLUDE

- **Digital skills and training;**
- **Barriers to employment for specific groups and demographics;**
- **Alternative approaches to skills & training; and**
- **Offering readers a primer on what we know, what we don't know, and how we can dig deeper on skills training & the future of work.**

RELEASES – SUMMER & FALL 2020

- **Indigenous skills and employment training;**
- **Competency frameworks and essential skills;**
- **Technology-enabled innovations in the skills and employment ecosystem;**
- **Understanding gig work and the experience of gig work in Canada;**
- **Barriers to employment based on gender; and**
- **Skills in small and medium-sized enterprises.**

RELEASES – JANUARY 2020

- **See the eight Skills Next papers from the winter 2020 release and the full series.**

ABOUT THE AUTHORS

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Stephen has been a writer and speaker on the future of work and the workplace of the future since 2011. With 18 years' experience in Consulting, Stephen leads transformations in talent strategy that enable Deloitte clients to feel personal purpose and impact, as the business drives improved results. Stephen is co-author of the Intelligence Revolution a recent paper on the 4th industrial revolution and implications for Canada, in partnership with the HR Professionals Association of Ontario.

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Dr. Wendy Cukier is one of Canada's thought leaders on disruptive technologies, future skills and inclusive innovation.

She is the Founder of Ryerson's Diversity Institute and leads a number of large partnership-based projects aimed at promoting diversity and inclusion in the workplace. She is leading, in collaboration with the Brookfield Institute and Ted Rogers School of Management, the newly-formed Women Entrepreneurship Knowledge Hub, funded by the Government of Canada which is focused on advancing an inclusive innovation system to increase and scale women-led enterprises.

She was an integral part of the bid for the new $365 million Ryerson-led Future Skills Centre, funded by the Government of Canada and is spearheading several research projects on behalf of FSC including the recent SkillsNext series with the Public Policy Forum.

During her tenure as Ryerson's VP of Research and Innovation she increased research funding by 60 percent over five years, and led in the creation of many large multi-stakeholder projects including the Incubate Innovate Network of Canada (I-INC) and the Ontario Centre for Workforce Innovation.

Wendy has won many awards for her work including the Harry Jerome Diversity Award, the Metropolis Research Award, the CATA Alliance Sara Kirke Award for Entrepreneurship and Innovation and 100 Most Powerful Women by WXN. More recently she was awarded the Women in Communications & Technology award for public service. She has been named a YWCA Woman of Distinction, a Woman of Influence and one of

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MARK PATTERSON

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Mark Patterson is a changemaker pioneering new approaches in career development, inclusive recruitment and contextualized labour market information to drive social and economic change. For more than a decade, he has focused on providing opportunities for diverse job seekers and addressing the needs of employers.

As Executive Director, Mark leads Magnet, a technology enabled social innovation project based at Ryerson University. A first-of-its-kind in North America, Magnet harnesses intelligent matching technology, data and analytics to effectively connectpeople, businesses, and organizations to opportunity; with the goal of helping regions and communities collaborate and grow . Magnet provides the digital infrastructure for Canada's Future Skills Centre, a forward-thinking research centre with a focus on how to best prepare Canadians today for workforce opportunities of the future.

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Karen has a research background in Interdisciplinary Social Sciences with degrees from Waterloo and McMaster, and is proud to have returned to Canada to re-engage on the vanguard of Canadian human rights after completing doctoral studies at the University of London (UK). Karen's work at Ryerson builds on her previous academic experience as a visiting professor at Bridgewater State University (US) and lecturer at the University of Oxford. She is driven to work in constructive partnerships to improve public policy and contribute meaningful research to boost outcomes for Indigenous peoples, racialized minorities, and other equity-seeking groups. Her research and teaching draw primarily from Indigenous studies, Sociology (social movement studies), and Social psychology (group identity theory, contact theory, and sociology of emotions).

EXECUTIVE SUMMARY

Whether through artificial intelligence or automation, we regularly read about the impacts of disruptive technology on the future of work, usually focussing on jobs that will change—think of taxi drivers who are being replaced by Uber drivers or hoteliers who fear the march of AirBnB.

We read much less often, however, about how technology might be used to address aspects of the other side of the coin—the skills gap.

Society can harness the power of data analytics, artificial intelligence, mobile communications, and virtual and augmented reality to assess and develop skills, better align supply and demand, and create more inclusive, productive and healthy workplaces.

There are many new and emerging models of learning and training that improve access, diversity and the quality of skills development and training as well as the practices of employers. This paper outlines places where technology can provide or is providing innovative approaches in the skills and employment ecosystem. It also details the ways in which technology can address the skills gap, including its potential for enhancing skills development and helping organizations improve and adapt. With real-world examples from around the world, it also reviews how technology can improve access, diversity and workplace inclusivity amongst equity-seeking groups.

There are areas for improvement, of course. Service providers, whether post-secondary institutions, private training providers or community organizations, need to better develop skills that meet the needs of employers, better meet the needs of job-seekers and provide supports, particularly for vulnerable groups. Funders, meanwhile, need to invest in what works.

It is also clear that to use technology to its best ends employers must have a better understanding of the skills they actually need and how to define and assess them. They must also better access the skills that are available from diverse job-seekers and employees and they need more evidence-informed approaches to recruitment, selection, promotion and performance management to support and retain employees and to create more inclusive work environments.

Implementation challenges for any technology applications in addressing the skills gap include leadership, the need for integrated strategies, a way to assess tool and systems options; and evaluation, feedback and improvement.

This paper outlines places where technology can provide or is providing innovative approaches in the skills and employment ecosystem. It also details the ways in which technology can address the skills gap, including its potential for enhancing skills development and helping organizations improve and adapt.

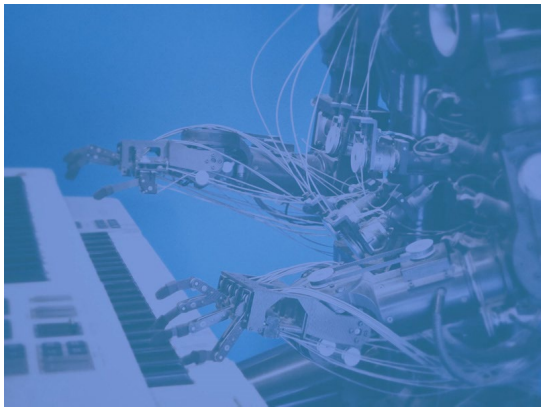
INTRODUCTION

Much has been written about the impact of disruptive technology on the future of work, most of it focusing on the jobs that will be changed, replaced and created and the extent to which supply and demand will be altered. But technology-driven innovation also has the potential to address aspects of the so-called skills gap. There are opportunities to harness the power of data analytics, artificial intelligence, mobile communications and virtual and augmented reality to assess skills, develop skills, better align supply and demand and create more inclusive, productive and healthy workplaces. There are many new and emerging models of learning and training that improve access, diversity and the quality of skills development and training as well as the practices of employers.[1] While not all innovations in skills development and training are dependent on technology, this paper will outline places where technology can or is providing innovative approaches in the skills/employment ecosystem.

This paper reviews some of the research examining the potential of technology to address the skills gap, including its potential for enhancing skills development and also building the capacity of organizations to adapt to change. Illustrated with real world examples from across sectors and around the world, this paper also reviews how technology is being used to improve access, and diversity and workplace inclusivity amongst equity-seeking groups.

[1] Cukier, W. (2019). Return on investment: Industry leadership on upskilling and reskilling their workforce.

There are opportunities to harness the power of data analytics, artificial intelligence, mobile communications and virtual and augmented reality to assess skills, develop skills, better align supply and demand and create more inclusive, productive and healthy workplaces.



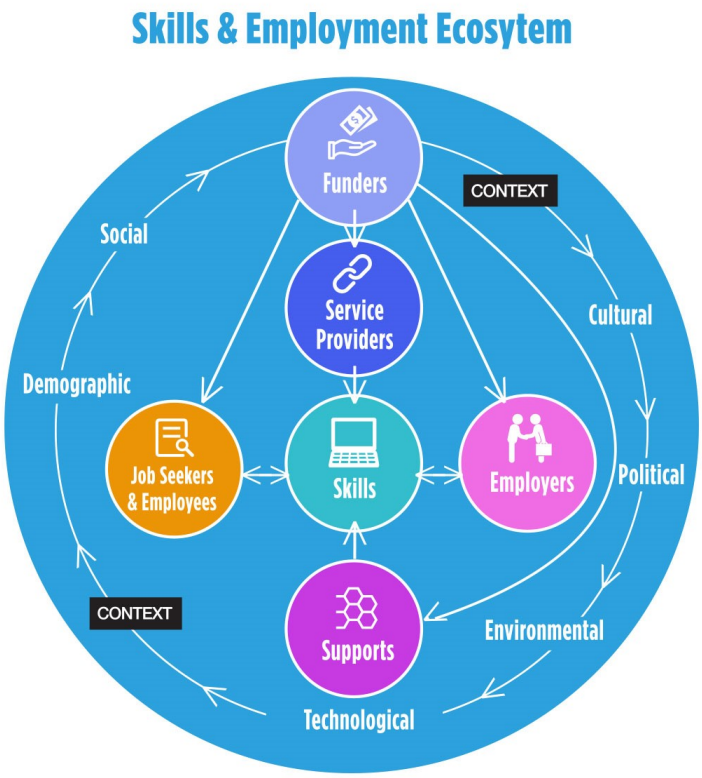
Increasingly organizations are turning to tools to assist in creating more inclusive workplaces. Systems such as Diversio enable people to assess their own practices and access leading ones. Technologies are also being used within organizations to provide support for employee health and well-being based on the notion that happy employees are productive employees and that the costs of turnover are high. Tools that regularly assess employee effectiveness for example are emerging as alternatives to annual employee engagement surveys, allowing granular analysis of challenges and interventions. Additionally, there are a host of assistive technologies and nudge tools aimed at providing employees with accommodations and support.

The preliminary portion of the paper will proceed as follows:

1. Overview of the literature on the uses of technology (i.e., to improve access and effectiveness), including an examination of opportunities in the skills ecosystem and a review of technologically enabled learning and diversity and inclusion outcomes;
2. A technology review;
3. A review of implementation challenges; and
4. Further areas of research.

OVERVIEW OF LITERATURE

While considerable attention has been focused on "the skills gap" and approaches to better equip job-seekers and workers with the skills they need and employers with the tools they need to ensure their needs are met, there has been no systematic review of the use of technologies to support these efforts. Much has been written about the disruptive impacts of technologies in the workplace, but less has been written about the application of those technologies to reduce friction in the skills ecosystem. Technology supports the development of skills—educational technology (known as edTech) startup investments alone are expected to reach a total industry investment of USD $275 billion by 2022. Technology can also support innovative approaches to recruitment, upskilling and reskilling and it can create inclusive work environments to retain talent and support lifelong learning. Lifelong learning is understood by business-development experts to be a mandatory component to future workplaces,[2] galvanizing employees to proactively adopt lifelong learning practices critical to the future of work.[3]

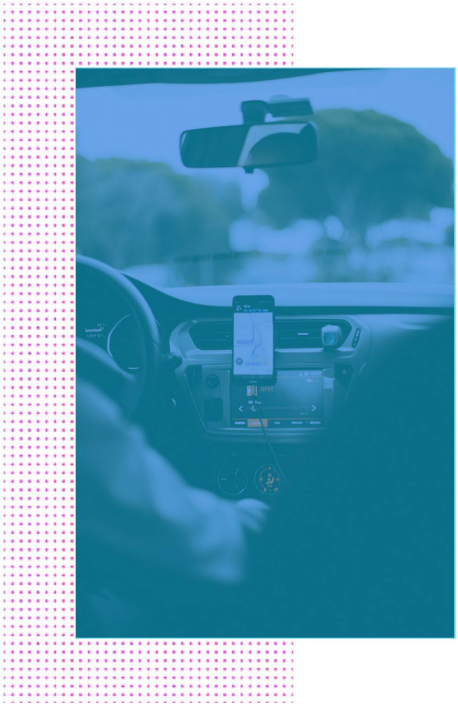


Research suggests that challenges in the ecosystem are on the supply and demand side. For example, workers and job-seekers may lack skills needed by employers, lack access to information needed to navigate the job market and employment systems, lack the supports needed to enable them to develop skills and may lack the motivation to learn and upgrade their skills. Service providers, whether post-secondary institutions, private training providers or community organizations need to better develop skills that meet the needs of employers, better meet the needs of job-seekers and provide wraparound supports, particularly for vulnerable groups. Funders need to invest in what works.

[2] Forbes Business Development Council. (March 30, 2020). 12 relevant skills business development leaders should hone today.

[3] Volini et al. (April 11, 2019). Learning in the flow of life: 2019 Deloitte global human capital trends.

It is also clear that employers must have a better understanding of the skills they actually need and how to define and assess them. They must also better access the skills that are available from diverse job-seekers and employees and they need more evidence-informed approaches to recruitment, selection, promotion and performance management to support and retain employees and to create more inclusive work environments.



Lifelong learning is understood by business development experts to be a mandatory component to future workplaces, galvanizing employees to proactively adopt lifelong learning practices critical the future of work.

TECHNOLOGY TO BRIDGE THE SKILLS GAP

While the literature on technologies to bridge the skills gap is massive, it is also fragmented and research often lags behind practice. As a complement to our review of the literature, Deloitte has undertaken an original assessment of current in-market technology solutions and tools focused on skills development, matching and assessment. This, too, has informed our analysis. In the world of work today, new skills are required and priorities are shifting frequently. The ability for a job-seeker to identify required skills, develop those skills, match them to jobs and gain credentials that recognize these skills-development activities are an important part of navigating the workforce. Technology can be a powerful tool to support this.

Looking at tools and platforms that can assist in delivering skills development and training, we identified prevalent market players in each category, including companies considered established players with a strong market presence, niche players with some marketplace experience and emerging and exciting players worth watching.

While different frameworks have been offered, we propose an approach that considers how technology contributes to five principal functions:

Skills development and education—the learning, experience and exposure to skills development;

Accessing skills—the sourcing, mapping and selecting of talent

Skills-gapping—including skills identification, gap, assessments and skills-position mapping;

Skills assessement—including measuring and evaluation, as well as credentialing; and

Skills utlization—including tools to support diversity and inclusion.

Skills development and education

Within the skills-development category, we have identified three sub-categories of tools and platforms, distinguishing between those that focus on education, experience and exposure (inspired by the Bersin model).[4] We will discuss each focus below in turn.

Education

Education technologies are those that support the development of skills through a variety of modalities using a range of very diverse tools. Learning technologies are incredibly diverse and while products often offer more than one function, we have distinguished education-focused skills-development tools and platforms as including those that offer and/or enable online learning management systems, as well as those that consolidate disparate learning resources into a single portal. Users from large enterprises or organizations, such as businesses or post-secondary institutions, typically use these types of resources, which perform well with many users. In the table contained in Appendix B, most variation and discrete examples of tools and platforms are found in this category: Skills Development: Education.

Digitally enabled skills training platforms and tools have assisted in the realm of education for a long time. *The Wiley Handbook of Learning Technology* (2016) contains 29 essays on the themes of instructional and educational technology, capturing a diverse array of uses as well as challenges with uptake, implementation and use of these tools and technologies.[5] Educational technologies have been widely adopted where possible and found to change and often enhance learning environments throughout all stages of formal education, including K to 12[6], post-secondary[7] and in specialized subjects such as language learning.[8] Different enabling technologies have also proved ideal for education in special education contexts, aiding in the customization and effective delivery of curriculum to people with a variety of learning challenges, from dyslexia[9] to autism.[10, 11, 12]

In addition to the use of learning technologies in formal educational spheres, technology contributes to skills development amongst labour force participants and can significantly enable the capacity of an

[4] Bersin, J. (2012). The new best-practices of a high-impact learning organization.

[5] Rushby, N. and Surry, D. (2016). The Wiley handbook of learning technology.

[6] Pierce, G. L. and Cleary, P. F. (2016). The K-12 educational technology value chain: Apps for kids, tools for teachers and levers for reform, p. 863–880.

[7] Bontly et al. (2019). Impact of technology on post-secondary classroom culture: A critical literature review, p. 327–346.

[8] Beckett, G. and Slater, T. (2020). Global perspectives on project-based language learning, teaching, and assessment.

[9] Dawson et al. (2018). Assistive technologies to support students with dyslexia, p. 226–239.

[10] Gal, E., Weiss, P. T. and Zancanero, M. (2019). Using innovative technologies as therapeutic and educational tools for children with autism spectrum disorder, p. 227–246.

[11] Sharma, A., Khosla, A. and Khosla, M. (2017). Technological tools and interventions to enhance learning in children with autism, p. 204–224.

[12] Hedges et al. (2017). Technology use as a support tool by secondary students with autism, p. 70–79.

employing or service-providing organization to deliver much-needed specific training to upskill workers.[13, 14, 15] For example, platforms that incorporate e-portfolios can make it possible for employees and workers (or providing organizations and clients)[16] to assess and track baseline skill levels as well as to facilitate and demonstrate skills acquisition. Consulting firm PwC has developed their own in-house app devoted to continuing education and digital literacy[17] and digital platforms are particularly ideal training sites for remote workplace engagement.[18] Many different technologies are emerging to promote learning in the workplace, often relying on learning management systems (LMS) and interactive technologies with functions that are enhanced through their being consolidated on a single platform.[19] The potential for technology to contribute substantively to education and skills development of all kinds is vast and ever-changing, responding dynamically to new offerings and digital innovations.

Within the education category, we have identified the following types of education-focused tools and platforms:

- Learning experience platforms provide a personalized, social, online learning experience consolidating different resources into a single portal. Examples include, Blackboard, Desire2Learn, and Moodle;
- LMS and content platforms deploy and track online training initiatives and include products such as SABA, SAP Success Factor, Trivie, Canvas (by Instructure) and Google Classroom;
- Program delivery platforms contain live or recorded programming for knowledge-sharing and learning. For example, AdeptPro (by Deloitte) and Howspace;
- Micro-learning platformsfocus on small quick-content consumption to meet specific needs and learning goals such as Axonify, Talent Cards and SmartUp;
- Language learning platforms are also emerging as important tools to develop language capability. Examples include DuoLingo, Babbel, Rosetta Stone Ltd. and Memrise.
- Content libraries are essentially curated materials gathered by a service-provider or offered by content producers and include services such as LinkedIn Learning (formerly Lynda.com), Udemy, Khan Academy, Coursera and EdX;

[13] Global Knowledge. (November 10, 2017). The future is now with AWS certifications.

[14] Illanes et al. (January 22, 2018). Retraining and reskilling workers in the age of automation.

[15] Manyika et al. (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation.

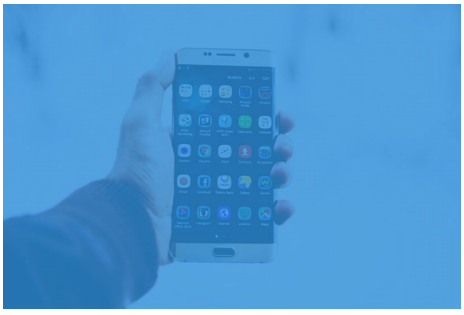
[16] van der Schaaf et al. (2017). Improving workplace-based assessment and feedback by an E-portfolio enhanced with learning analytics, p. 359-380.

[17] Moore, E. (March 28, 2018). The surprising new benefit PwC uses to attract and retain top talent.

[18] Ackley, D. (March 2019). How to ignite better learning and development through digital.

[19] Wang, M. (2018). Emerging technologies for workplace learning, p. 29-39.

Innovative uses of collaborative technologies have the potential to help build relationships, share information and best practices and provide direct coaching.



- Knowledge-management services both store and retrieve knowledge to improve understanding including such tools as SharePoint and KMSLighthouse;
- Digital adoption and workflow learning tools offer optimization of business performance through "smart" software that guides and assist employees in doing their jobs better. For example, Enable Now and Apty; and
- Learning record store platforms are repositories for learning records that are connected from connected learning-management systems in which learning activities are conducted, such as GrassBlade, Learning Locker or Watershed.

Experience

Experience-oriented tools and platforms focus on facilitating and enabling the experience of skills development either by allowing for collaboration, coaching and knowledge-sharing or even through modelling and providing VR simulations.

Digital technology has injected particular capacity into this collection of tools and platforms, constitutive of software and technology that enables group thinking, communicating and collaborating. Collaboration technologies have enabled increased global diversity across international teams and research partnerships and one study conducted with employees from a Fortune 500 company found that widespread use of information and communication technology (ICT) across globally situated teams mitigated against some of the challenges that come with multicultural working while amplifying some of the benefits.[20] Specifically, they found that

[20] Shachaf, P. (2008). Cultural diversity and information and communication technology impacts on global virtual teams: An exploratory study, p. 131-142.

communicating over ICT was protective against intercultural miscommunication, while the use of online platforms enhanced a sense of belonging, which increased team cohesiveness, inclusion and a sense of shared common ground.

Besides peer-to-peer digital collaboration, many tools and platforms have been developed to enable coaching and mentoring capacities. Innovative uses of collaborative technologies have the potential to help build relationships, share information and best practices and provide direct coaching. For example, multi-stakeholder innovation platforms were used in West and Central Africa, allowing stakeholders to learn from more experienced knowledge facilitators how to use new agricultural technologies.[21] E-mentoring has been used to nurture discrete skills as well as leadership potential amongst doctoral students, and, in fact, some doctoral programs are moving completely online, necessitating the heavy use of technology to facilitate substantive elements of doctoral-degree skills development.[22] Online platforms are also being used for peer-to-peer collaborations that require multi-stakeholder connection and reflection, even when the topic of reflection is that of physical experience (e.g. sports coaching).[23] In general, it has been found that workers find digital communications to be less high-quality and more isolating than in-person interactions, but one study showed that especially in remote working scenarios even increased digital connection can mitigate against a sense of loneliness.[24]

Technology is particularly effective in offering opportunities for learners to build reasoning and problem-solving skill sets in simulations, such as those with augmented reality (AR) and virtual reality (VR) elements.[25] In addition, simulation-based learning has been used to good effect in the development of social-emotional skill sets in various learning communities, from pre-service teachers[26] to children with autism spectrum disorder.[27] Outside of formal education or work, people have been communicating through technology like never before, through platforms and tools that allow people to share images,

[21] Sanyang et al. (2016). A paradigm shift in African agricultural research for development: The role of innovation platforms, p. 187-213.

[22] Hyatt, L. and Allen, S. (2018). Advancing doctoral leadership education through technology.

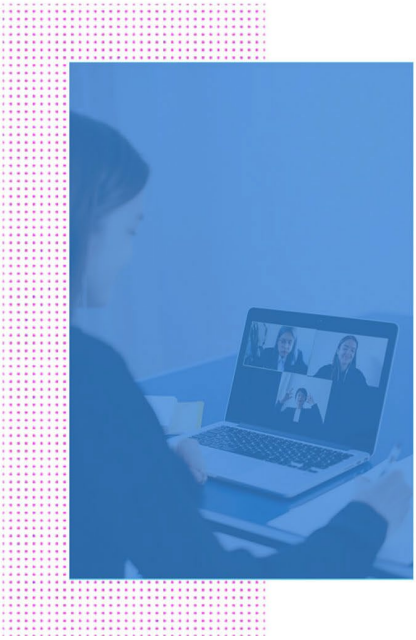
[23] Stoszkowski, J. R., McCarthy, L. and Fonseca, J. (2017). Online peer mentoring and collaborative reflection: A cross-institutional project in sports coaching, p. 118-121.

[24] WorkplaceTrends. (November 13, 2018). The work connectivity study.

[25] Wang et al. (2013). Connecting problem-solving and knowledge-construction processes in a visualization-based learning environment, p. 293-306.

[26] Weissblueth, E. and Nissim, Y. (2018). The contribution of virtual reality to social and emotional learning in pre-service teachers, p. 1551-1564.

[27] Chua et al. (2017). ICT-enabled emotional learning for special needs education, p. 29-45.



Collaboration technologies have enabled increased global diversity across international teams and research partnerships

video and text on an unprecedented scale, helping people maintain and build connections over distance[28, 29], as well as presenting challenging regulatory problems for governments worldwide.[30]

- Collaboration tools are types of software or services that allow people to work together online with added group-work and collaboration functionalities, such as Trello, SAP Jam Collaboration and Microsoft Teams;
- Coaching and mentorship tools are assessment instruments, evaluation tools and 360-degree interviews coaches and mentors can use to evaluate their own practices and the work and practices of their mentees. Examples include Noomii, Together and Graduway;
- Simulation software (AR/VR) focuses on modelling real-life scenarios with a set of mathematical formulas and AR/VR functionalities. Examples include CoSpaces Edu, zSpace and AugThat!;
- Social-Emotional Learning (SEL) Systems facilitate the development of self-awareness, self-control and interpersonal skills that are vital for school, work and life success. Examples include Aperture Education and Peekapak;
- Online Chat / sharing involves communication over the Internet offering real-time transmission of text messages and file-sharing from sender to receiver. Examples include Slack, Skype for Business and Zoom.

[28] Eichenberg, C., Huss, J. and Küsel, C. (2017). From online dating to online divorce: An overview of couple and family relationships shaped through digital media, p. 249-260.

[29] McClure, E. and Barr, R. (2017). Building family relationships from a distance: Supporting connections with babies and toddlers using video and video chat, p. 227-248.

[30] Haines, C. (2019). Apps for children, regulatory issues.

Exposure

This category of skills-development technologies is made up of social networks and platforms designed explicitly for the purposes of group sharing and learning. They may have no built-in learning functionality, but have been used as tools in classrooms and workplaces to generate measurable learning outcomes either to deliver curricula[31], or through teaching digital skills by delivering content-generation assignments.[32] Others, such as social-learning platforms, allow for new forms of teaching, enabling increasingly decentralized teaching practices and facilitating new phenomenon such as the "flipped classroom," wherein multi-directional knowledge dissemination is baked into the technology-enabled learning experience.[33] These social-learning platforms are particularly impactful because they can democratize learning spaces and fundamentally shift learners from passive to active roles.[34] Outside of the classroom, these kinds of platforms can also be used to promote multi-loop social learning with

[31] Moghavvemi et al. (2018). Social media as a complementary learning tool for teaching and learning: The case of YouTube, p. 37-42.

[32] Orús et al. (2016). The effects of learner-generated videos for YouTube on learning outcomes and satisfaction, p. 254-269.

[33] Wallace, A. (2013). Social learning platforms and the flipped classroom, p. 198-200.

[34] Al-Zahrani, A. M. (2015). From passive to active: The impact of the flipped classroom through social learning platforms on higher education students' creative thinking, p. 1133-1148.

multiple stakeholders over time.[35] Perhaps the most interesting part of these technology-enabled types of content-sharing and network-accessing tools is that in some cases they already are ubiquitous in the learning and working worlds. Advisers from recruiters to career counsellors, for example, note that a strong online professional social network is crucial for movement between many jobs or careers.[36, 37] Further, in our personal lives,[38] the vast majority of us are exposed to tools and platforms in this category.

- Social networks refer to those social-sharing platforms focused solely on interactions and relationships of a personal, non-business manner (although they may be used for business purposes outside of their initial design scope). Examples include Facebook, Instagram and Meetup;
- Professional social networks refer to those social networks focused solely on interactions and relationships of a business nature rather than including those designed for personal, non-business interactions (although they may be used for personal communications as well). Examples include LinkedIn and Fishbowl;
- Social learning platforms are those where learning is facilitated through observation of other people's attitudes, views, behaviours and outcomes of those behaviours. The platform presents opportunities for the learner to imitate those behaviours or attitudes, modelling them. Examples include Tovuti and Edmodo;
- Video content platforms include platforms that provide live and recorded content on a website, which often has an inherent learning component present. Examples include Vimeo, YouTube, Vidyard and Echo360.

[35] Medema, W., Wals, A. and Adamowski, J. (2014). Multi-loop social learning for sustainable land and water governance: Towards a research agenda on the potential of virtual learning platforms, p. 23-38.

[36] Aguado et al. (2019). LinkedIn "Big Four": Job performance validation in the ICT sector, p. 53-64.

[37] Kelsey, T. (2017). LinkedIn, p. 87-95.

[38] Reyes et al. (2018). Fear of missing out and its link with social media and problematic internet use among Filipinos, p. 503-518.

Accessing skills

Within the accessing-skills category, we have identified two sub-categories of tools and platforms, distinguishing between those that focus on sourcing (finding people with the right skills) and skill mapping (reaching out to people with the right skills and engaging them).

Sourcing

Platforms and tools that are oriented towards sourcing have been applied across the world and throughout many industries. Some of these platforms have been designed specifically to capture temporary labour sources and source skilled individuals for tasks divorced from stable employment contracts. Workers who make themselves available to temporary labour pools often exchange standard regulatory protections associated with full-time employment relationships for flexible labour market attachment.[39, 40] While so-called gig work is a very old concept, technology-enabled platforms have restructured, altered and, in many cases, widened the scope of people who have access to gig-working opportunities. Technology has significantly increased and eased access to temporary and task-based labour pools.[41] On the other hand, technology has allowed businesses and non-profits to focus the advertisement of positions to unprecedented numbers of quality, internationally situated candidates though innovations in talent search and acquisition practices.[42]

Many companies have pared down their internal recruitment capacities, preferring to hire external recruiters to source talent externally. This has introduced an added level of difficulty as companies struggle to articulate accurately to recruiters what skill sets they are really looking for.[43] Nonetheless, big data analytics has allowed for actors on the supply and demand sides of employment equations to identify ideal matches between skill sets and job descriptions.[44, 45] Mimicking a more traditional-style job board or jobs sections on a print publication, many platforms exist at different scales of distribution to enable access between available jobs and job candidates, seeking to streamline the recruitment and job-seeking processes. The arena of sourcing and accessing skills has been profoundly impacted by increased connectivity and by the potential of technology-enabled big data-analytics.

[39] Graham, M. and Woodcock, J. (2020). The gig economy: A critical introduction.

[40] Prassl, J. (2018). Humans as a service: The promise and perils of work in the gig economy.

[41] Wood et al. (2019). Networked but commodified: The (dis)embeddedness of digital labour in the gig economy, p. 931-950.

[42] Palshikar et al. (2019). Analytics-led talent acquisition for improving efficiency and effectiveness, p. 141-160.

[43] Cappelli, P. (2019). Your approach to hiring is all wrong.

[44] Fang, Y., de Rijke, M. and Xie, H. (2016). DDTA 2016: The workshop on data-driven talent acquisition, p. 2507-2508.

[45] Walford-Wright, G. and Scott-Jackson, W. (2018). Talent rising: people analytics and technology driving talent acquisition strategy, p. 1475-4398.

- Peer-to-peer recruitment refers to platforms and tools that allow employees of a business to source and recruit top talent based on their network of connections. Examples include HireUp, FirstBird and Drafted;
- Social search are platforms and tools that use social media and publicly available data to find, attract and hire talent. Examples include TalentBin, Human Predictions and Entelo;
- Temporary labour marketplace refers to platforms that facilitate temporary labour matches between candidates and employers for short-term projects and often niche business needs. Examples include Gigster, Upwork and TaskRabbit;
- Crowd source recruitment includes platforms that allow idea-generation and niche skills to be outsourced to distributed groups of people for either one-time projects or long-term partnerships. Examples include 99designs, Zooppa and Topcoder;
- Job board and job board aggregators are digital spaces that deal specifically with employment opportunities or careers. Examples include Snag, Switch, Glassdoor and Indeed.

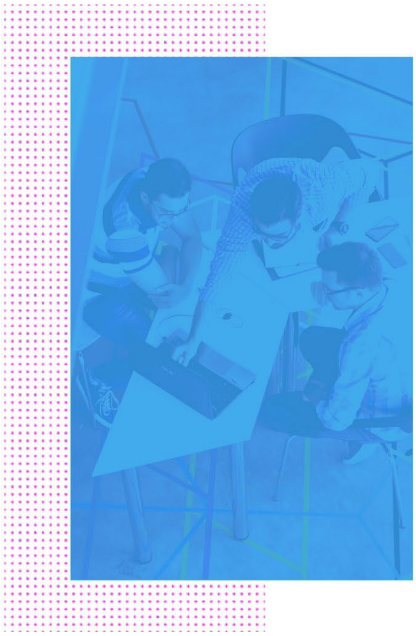
The arena of sourcing and accessing skills has been profoundly impacted by increased connectivity and by the potential of technology-enabled big data-analytics

Skills-mapping

Skills-mapping platforms support granular identification of skill sets and demonstration of skill gaps that job-seekers or currently employed workers can use to guide their career planning process. This kind of technology can be particularly useful for skills management inside an organization or business seeking to upskill and redeploy employees internally, rather than recruit for outside talent. Platforms that can combine skills-gap assessment with delivery of

tailored training offerings are ideal for these purposes.[46] In some educational arenas, such as medical education, artificial intelligence has been widely adopted to help assess student psychomotor skills during highly technical tasks, such as performing surgery.[47] For these purposes, machine learning can be applied to provide accurate and instantaneous feedback on performance in an area where precision matters. In K-to-12 curriculum, artificial intelligence is also being explored as a possible tool to assess student work, with studies citing value-adds such as decreasing teacher administration loads to enable more creative pedagogical engagement, as well as decreasing teacher bias in marking.[48] Other studies have found that artificial intelligence (AI) can be used to promote competence development amongst workers in small- and medium-sized enterprises through informing and supporting training and workplace-integrated learning initiatives.[49]

- AI skills mapping consists of platforms that involve using AI-enabled tools to evaluate the skills that present and future employees have and how they align with business needs. Examples include FutureFit, Vervoe and Plum.io.



Technology can be particularly useful for skills management inside an organization or business seeking to upskill and redeploy employees internally, rather than recruit for outside talent.

[46] Ras et al. (2017). Bridging the skills gap of workers in industry 4.0 by human performance augmentation tools: Challenges and roadmap, p. 428-432.

[47] Winkler-Schwartz et al. (2019). Artificial intelligence in medical education: Best practices using machine learning to assess surgical expertise in virtual reality simulation, p. 1681-1690.

[48] Chattopadhyay et al. (2018). Applications of artificial intelligence in assessment for learning in schools, p. 185-206.

[49] Ibid.

Skills-gapping

Tools and platforms in the skills-mapping section are those that operate to define what skills are required, or will be required, for particular jobs as well as to identify skills gaps within organizations. The tools and platforms in this section all assist with skills identification, gap assessments and skill-position mapping.

Skill identification

Workforce analytics can be employed to support the identification of the skills workers have versus the skills they will need. Platforms such as MicroStrategy are multi-functional, offering capacities in predictive analysis, data discovery and mobile analytics in a user-friendly format[50] that lends itself to business purposes. Business intelligence (BI) tools and platforms, until recently, mainly or only included reporting functionalities. Contemporary BI tools also include data mining, improved analytics tools and online analytical processing services, bringing analytics capacities to business of all sizes.[51] BI for human resources (HR) analytics has shifted HR processes from a primarily static system to one that is dynamic mobile-enabled and cloud-based.[52] Despite the growth of the market value of this industry and links drawn between the use of workforce analytics and increased profitability, there is a lack of peer-reviewed research assessing the impact of business use of HR analytics, indicating an opportunity for research in this area.[53]

- Workforce analytics refers to a combination of software and methodology that applies statistical models to worker-related data, allowing enterprise leaders to optimize human-resource management. Examples include MicroStrategy, Crunchr and Foresight.

[50] Anoshin, D., Rana, H. and Ma, N. (2016). Mastering business intelligence with microstrategy.

[51] Bhombe et al. (October 1, 2019). Comparative analysis of two BI tools: Micro strategy and tableau.

[52] Credence Research. (2019). Global HR analytics market (by component (solution and services), by deployment mode (on-premise and cloud), by application (payroll, recruitment, retention, workforce & employee management, and employee development), by end-use vertical (banking, financial services & insurance (bfsi), retail & consumer goods, it & telecom, aero/auto/transportation, healthcare & pharmaceuticals, education, oil & energy, media & entertainment, and others))—growth, future prospects and competitive landscape, 2019 - 2027 (no. 60004-11-19).

[53] Marler, J. H. and Boudreau, J. W. (2017). An evidence-based review of HR Analytics, p. 3-26.

Tools and platforms in the skills-mapping section are those that operate to define what skills are required, or will be required, for particular jobs as well as to identify skills gaps within organizations.

Gap-assessment

Assessing business and organizational skills gaps is necessary to create a gap-bridging strategy. Identified gaps can be filled by new recruits, or by current employees, but in either scenario clearly identifying the location and nature of skills gaps is key to mitigation. Organizations need to understand their internal skills gaps.

Gap assessments can be conducted by external management consultants and leading players in that field, such as Deloitte, offering a suite of gap-assessment products businesses can procure to identify general, or specific latent skills gaps, or gaps that have formed as a result of environmental changes such as the introduction of new legislation[54] or through technological change. Gap analysis can be conducted internally, helping a business from a strategic level by comparing the condition of a business with that of the industry. Gap analysis can also be conducted at the operational level, comparing the current state of business performance against stated goals.[55] Specialized gap analyses that address maturity lifecycles and gaps between present state and desired state of maturity are of particularly acute importance for young SMEs looking to grow.[56] Examples such as Gyrus and Avilar are designed for use in business and are classified as corporate learning management systems to help business conduct their own ongoing gap analyses.[57]

[54] Deloitte. (2019). GAP analysis: BIAT and FIAT.

[55] Creately. (March 6, 2018). 5 gap analysis tools to analyze and bridge the gaps in your business.

[56] Naskali et al. (2018). Mapping business transformation in digital landscape: A prescriptive maturity model for small enterprises, p. 101-116.

[57] McIntosh, D. (2018). Vendors of learning management and eLearning products.

- Skills-gap analysis refers to tools used to determine the training and/or hiring requirements of an employee, or group within the organization. Examples include Gyrus and Avilar.

Skill-position mapping

Tools and platforms are also used to map and track the skills required in a particular trade or profession. Job markets and workplaces have changed considerably in the last few decades, such that university degrees and grades no longer communicate the full breadth of a person's skills.[58] Now, competency mapping is seen as an essential HR practice for business efficiency and overall success, linking skills with the knowledge and attitudes required for doing any given job.[59] In this arena, tools and platforms are particularly useful as repositories and linking mechanisms to bring together information about job requirements with existing skill sets.

- Skills mapping refers to the process of identifying the specific skills, knowledge, abilities and behaviours required to operate effectively in a specific trade, profession or job position. Examples include SoftExpert HDM, MapSkiller: Competency Mapping Tool, SkillMap and Centranum.

Skills assessment

Skills-assessment tools and platforms in this area focus on measuring and evaluation, as well as credentialing. This area of focus is increasingly important as skills become divorced from the traditional credentialing systems found in colleges or universities.

Measurement

Measuring skills is challenging to do in a systematized way. Even official assessment systems are often criticized for particular elements and features. There is a wide proliferation of online tests and assessments tools for a seemingly limitless range of areas—from assessments about specific knowledge to those on social and emotional skill capacities. Skills assessments are becoming more popular, as recent research shows that 76 percent of businesses of 100 or more employees employ some sort of skills measurement exercise during recruitment and talent acquisition, assessing areas such as aptitude and personality.[60] This same research showed that skills assessments are used for 72 percent of middle-management positions and up to 80 percent of senior roles, while only used to fill 59 percent of entry-level positions.[61]

[58] Weise, M. (September 20, 2016). We need a better way to visualize people's skills.

[59] Awasthi, S. and Sharma, R. C. (2017). Competency mapping: A conceptual perspective, p. 290-305.

[60] SHL. (2018). Global assessment trends report 2018.

[61] Ibid.

- Skill benchmarking and online skill assessments are processes and tools for identifying competency levels and skills required for a particular job. Examples include The Predictive Index, eSkill, SkillRobo and The Athena Quotient.

Credentialing

These tools and platforms are a natural extension of the skills-measurement category above. Some certifying bodies have captured large portions of the market and gained considerable amounts of workplace recognition, allowing workers or job-seekers to gain transferable credits that are understood by multiple workplaces within the same or closely linked industries. Credentials can be a helpful complement to college or university degrees because they provide a more granular look at the specific skills a person might need to succeed in a profession.[62] Private corporations have recognized the value in this kind of innovative education system.[63]

- Online certifying bodies, eportfolios and badging consists of digital badging tools that showcase skills across online social and employment platforms. Examples include LinkedIn Skills Assessment and Credly.

[62] EDUCAUSE. (2020). Badges and credentialing.

[63] Greene, P. (February 16, 2019). Education micro-credentials 101: Why do we need badges?.

Diverse skills utilization, including tools to support diversity and inclusion

In our diverse skills utilization section we have identified just one main category we refer to as skills-matching. In the context of this section on diversity and inclusion we are referring to skills matching as the process of upskilling and matching on the supply and demand sides of the employment equation.

Skills matching

Analytics-led talent acquisition is a key method of eliminating bias, at least on the recruitment end of the spectrum.[64] Recruitment processes have been shown to be biased and prone to unfair processes.[65, 66] Examples of tools and platforms from the "bias-free-recruitment" tier include two emerging and exciting tools, Magnet and Bryq, as well as one established tool, Blendoor. The established example, Blendoor, seeks to eliminate unconscious bias in recruitment by aggregating data from multiple and diverse sources and using blind review and analytics to remove unconscious bias from talent-search algorithms. Both Magnet and Bryq build on this kind of technology with the inclusion of advanced features such as tailoring job searches to candidates based on their skills profiles and matching jobs to skills as determined through on-platform psychometric tests.

Examples of tools and platforms from the 'supporting accessibility and inclusion' tier include two niche tools, Jopwell and Out and Equal, one emerging and exciting one, GapJumpers, and an established tool, Employ Diversity—all of which were developed in the U.S. GapJumpers has shown that though women are hired for fewer than a quarter of ICT jobs, they apply for more than 50 percent of them.[67] These tools and platforms offer a range of different value-adds from a diversity and inclusion angle. For example, Jopwell offers the ability for partners to develop a profile showcasing corporate diversity initiatives, aiming to market their company to diverse talent bases. All of these tools and platforms offer the ability to separate out identity markers from skills, isolating matches between skill profiles and jobs from any other factors. Some, such as Employ Diversity, also offer educational tools for demand side use, such as offering podcasts, videos and webinars to recruiters and corporate employees to help guide their efforts to recruit diverse talent.

It is also critical for employers to create safe and inclusive environments and software and programs that can help organizations tackle unconscious bias and create workplaces that will be more attractive for diverse employees.[68] Culturally and gender-diverse employers outperform less diverse ones and there is

[64] Palshikar et al. (2019). Analytics-led talent acquisition for improving efficiency and effectiveness, p. 141-160.

[65] Ibid.

[66] Johnson, S. K., Hekman, D. R. and Chan, E. T. (April 26, 2016). If there's only one woman in your candidate pool, there's statistically no chance she'll be hired.

[67] Recruiterbox. (2020). 6 ways to remove hiring bias from the recruitment process.

[68] Wilkinson, M. (June 13, 2017). 8 essential guidelines to reduce unconscious bias in your recruitment process.

a strong business case for attracting and keeping diverse top talent.[69] Businesses widely agree that effective diversity and inclusion programming can result in measurable gains on several metrics.[70, 71, 72] When diverse employees feel included, they perform better.[73]

Discrimination in the workplace is often (though not always) subtle, but results in measurable disadvantages and glass ceilings. The apps in this category mainly aim to address problems of bias, attitudes and beliefs that might cause a recruiter or senior executive to dismiss or ignore the positive qualities offered by an employee or job-seeker based on their identity.[74] Human beings are very prone to bias, leading to unethical decisions[75, 76] —cognitive bias is based on a cognitive strategy of sorting information when we have inconsistencies or gaps in our knowledge.[77] Cognitive biases can cause us to make uninformed design choices and miss opportunities for creative discovery[78] but, more importantly, can cause a recruiter or senior executive to make erroneous judgements that can lead to unfortunate or even illegal decision making.[79, 80] Please note, these apps do not directly address problems related to forms of conscious bias, which we acknowledge is still a defining organizational factor in many global workplaces.

- Bias-free recruitment refers to tools and platforms that enable businesses to implement fair and inclusive hiring practices through facilitating access to diverse job-seeker networks. Examples include Magnet, Blendoor and Bryq.
- Platforms and tools that focus on demand-side upskilling attempt to remove bias from hiring mainly by promoting inclusivity within companies and organizations, aiming to create attractive workplaces for diverse employees. Examples include Employ Diversity, Jopwell and Out and Equal.
- Bias-free assessment consists of tools and platforms that seek to reduce or exclude the noise and prejudices that typically skew assessment processes. Examples include Lumina Learning, GapJumpers and Pymetrics.

[69] Hunt, V., Layton, D. and Prince, S. (2015). Why diversity matters.

[70] Morse, G. (July -August 2016). Designing a bias-free organization, p. 62-67.

[71] Atcheson, S. (September 25, 2018). Embracing diversity and fostering inclusion is good for your business.

[72] Fenwick & West LLP. (2013). Gender diversity in Silicon Valley: A comparison of Silicon Valley public companies and large public companies.

[73] Deloitte Australia and Victorian Equal Opportunity and Human Rights. (2013). Waiter, is that inclusion in my soup? A new recipe to improve business performance.

[74] Agarwal, P. (October 19, 2018). Here is how bias can affect recruitment in your organisation.

[75] Banaji, M. R., Bazerman, M. H. and Chugh, D. (December 1, 2003). How (un)ethical are you?.

[76] Project Implicit. (2011). Overview.

[77] Rossheim, J. (2020). If you suspect hiring bias.

[78] Liedtka, J. (2015). Perspective: Linking design thinking with innovation outcomes through cognitive bias reduction, p. 925-938.

[79] Rossheim, J. (2020). If you suspect hiring bias.

[80] U.S. Equal Employment Opportunity Commission. (2020). Sex-based discrimination.

IMPLEMENTATION CHALLENGES

Several studies of digital transformation have offered models to develop a digital strategy to support a systems-wide approach. The challenges involved in adopting these tools are not dissimilar to those related to other technologies.

Leadership

Digital transformation requires a strategic orientation to talent and skills at the most senior level of the organization. Not only does it include making decisions about what are often massive investments, but also involves clearly communicating the rationale (i.e., the what and the why) behind the change to facilitate employee understanding and buy-in and to provide the processes and incentives needed to advance change.[81] A 2018 report by McKinsey and Ashoka indicated that more than a third of respondents confirmed that culture and behavioural changes are the leading challenge to implementing digital solutions.[82] To be successful, a strategy that embraces technology as an enabler not a driver is key.

[81] Center for Creative Leadership (CCL). (2020). How to be a successful change leader.

[82] Hoell, R., Daub, M. and Wiesinger, A. (2018). The skilling challenge.

Integrated strategy

Beyond selection of the right tool, barriers to digital transformation can be rooted in rigid structures that prevent organizations from being agile to change.[83] For example, often talent and skills are the responsibility of the human-resources department, where understanding of the technologies may be limited, whereas responsibility for technologies may rest in the information systems department where there is limited understanding of business processes and needs.

Assessing tool and systems options, advantages and disadvantages

Using technology to help bridge the skills gap it created will be essential; but which tools are best suited for organizations, based on such considerations as size and sector, continue to be unknown. There are a number of tools available for delivering training across different platforms and mediums and they are focused on different skills. However, fragmentation in the market makes it difficult to navigate not only what systems and tools do what, but also how they fit together.

Implementation

Most technology projects run over budget and overtime, in part because of the many unknowns, in part because of resistance to change and in part because of the lack of user-centered approaches. While it slows down the process at the front end, engaging users from the outset will often speed up the implementation process. User engagement is as important as rigorous project management.

Evaluation, feedback and continuous improvement

Ensuring that clear goals, outcomes and accountability frameworks are embedded with the project are critical, but so are the feedback loops to inform implementation and ensure iteration when needed. There are many projects using technology to bridge the skills gap, but far fewer that can demonstrate the return on investments.

[83] Harvard Business Review. (HBR). (2017). High-performance sourcing and procurement, driving value through collaboration.

AREAS FOR FURTHER RESEARCH

Organizations are incredibly varied in terms of industry sector, size, goals and objectives. But regardless of these differences, there is general agreement that access to talent and skills are the competitive advantage.

- **How do organizations develop an evergreen plan for talent and skills in an uncertain future?**
- **What are the tools and techniques they can use to assess, develop, procure and apply skills?**
- **Among the myriad technologies and tools, what are the advantages and the disadvantages of different approaches?**
- **What works for whom and in what contexts?**
- **How can businesses, governments and institutions work together on this complex issue to develop shared platforms?**

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APPENDIX A:

Technology Learning Platforms & Tools

The tools and platforms in the table below have been organized by marketplace position, theme, and category. While some offerings align to one category, we recognize some can be applied to many. In such cases, we identified the most prevalent market players in that category.

MARKETPLACE POSITION

ESTABLISHED	Recognized organizations in the industry with a strong marketplace presence and leading reputation.
NICHE	Recognized organizations in the industry with some marketplace experience, focusing on a specific value proposition for a niche offering.
EMERGING AND EXCITING	New and/or growing organizations in the industry with minimal or smaller foothold in the marketplace, providing new technology offerings.

1. Skills Development – Skills development can come from a variety of learning modalities and can include:

a. Education

Company	Overview	Value Proposition
Learning Experience Platforms		
Blackboard (US) www.blackboard.com	Competency-based, online and professional learning tools.	Teaching and learning platforms, include Blackboard Learn, Blackboard Instructor App, and Blackboard Classroom. Clients Include: Amazon Web Services (aws.amazon.com), Pearson (www.blackboard.com), Harvard Business Publishing Education (hbsp.harvard.edu).
Desire2Learn (CAN) www.d2l.com	Cloud-based LMS used by schools, higher education, and businesses for online and blended learning experiences.	Adaptable and customizable, offering webinars to support students, higher education and corporations with various learning/training requirements. Clients Include: Canadian Sport Institute Calgary (www.csicalgary.ca/), American Nurses Association (ANA) (www.nursingworld.org/), Saint Leo University (www.saintleo.edu)
Moodle (US) moodle.org	Creates a highly customized learning experience.	Allows users to set learning goals or customized curriculum. Clients Include: eThink Education Canada (ethinkeducation.com/), Lingel Learning (lingellearning.com/), Open 2 Know (open2know.ca)
BlueDrop www.bluedrop.com/	Largest provider of courseware in Canada with specialization in large and complex training program needs.	Customizable learning experience with SkillsPass certificate tracking. Government of Nova Scotia and Government of NewFoundLand (CAN)
LMS and Content Platforms		
Saba (US) www.saba.com	Supports continuous and self-directed learning, content curation and social collaboration capacities.	Includes learning analytics tools built-in to give deeper insights into learning programs including measurement. Clients Include: Air Canada (www.aircanada.com/), City of Houston (www.houstontx.gov), Cornell University (www.cornell.edu)

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SAP SuccessFactors (US) www.sap.com	Creates courses, tracks employee learning progress, and enables insights with analytics.	Identifies courses aligned with their professional development needs. Clients Include: American Airlines (www.aa.com), Corning (www.corning.com), EDF Energy (edfenergy.com)
Trivie (US) www.trivie.com	Features customizable content and learning tailored to user knowledge and gap assessment.	Gamified learning outcomes, providing analytics to measure learning around skill themes: General training, safety, sales, marketing, onboarding, and knowledge assessments. Clients Include: Unilever (unilever.com),Charleston Southern University (www.charlestonsouthern.edu), Phillips 66 (www.phillips66.com)
Canvas (by Instructure) (US) canvas.instructure.com	Offers standards-based grade books, formative assessments, course authoring tools, mobile communication capacities, and integration with school teaching tools.	Includes student-led course design and supports blended to fully virtual learning. Clients Include: Dixie State University (dixie.edu), Likeable Media, Inc. (likeable.com), Cardinal Stritch University (stritch.edu)
Google Classroom (US) classroom.google.com	Users create, distribute, and grade assignments all through a digital environment streamlining file exchange.	Functions include: Assignments; Grading; Communication (multiple directions). Clients Include: Responsive Education Solutions (enlyft.com), Lindenwood University (lindenwood.edu), Denver Public Schools (dpsk12.org).
Program Delivery Platforms		
AdeptPro (by Deloitte) (US) www2.deloitte.com	Preconfigured development options range from self-paced discovery, to immersive in-person workshops.	Lessons focus on key skills and attitudes needed in business. Learning objectives focus on: Inclusion; Exponential leadership; Teaming; Tech Savviness; HR. Client List Unavailable
Howspace (US) www.howspace.com	Supports organizational change initiatives to organize and offer corporate learning programs.	Users tailor their learning dashboard to match company processes or create a different process with different aesthetic elements, and new content pages. Clients Include: Learning Tree International (https://www.learningtree.ca), Innovestor (innovestorgroup.com), Haaga-Helia University of Applied Sciences (www.haaga-helia.fi)

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Micro-Learning Platforms		
Axonify (US) axonify.com	Adaptive micro-learning platform that features short bursts of personalized, gamified modules and provides impact-measurement and analytics tools.	Helps users use software to create content tailored to success metrics initially defined by the user. Includes coaching and training tools to help users maintain learning objectives in their workplace. Clients Include: Bloomingdale's (www.bloomingdales.com), Walmart (www.walmart.com), Levi's Strauss and Co (axonify.com)
TalentCards (US) www.talentcards.com	Micro-learning platform for condensed learning offerings on the go.	Uses gamification to engage and assess learning through regular assessments, using competition between users to motivate participation with a leaderboard option. Clients Include: Visma (www.visma.com), Elearning Space (elearning.space), GROUPER Knowledge Transfer (www.grouper.cl)
SmartUp (US) www.smartup.io	Micro-learning tool for peer-to-peer knowledge creation, and sharing.	Uses analytics to monitor and assess learning across an organization enabling them to upload, create, and share content. Builds a community between users across an organization with communication and collaboration tools. Clients Include: Harvard Business School (www.hbs.edu), Deloitte (www2.deloitte.com), Rutgers University (www.rutgers.edu)
Language Learning Platforms		
DuoLingo (US) www.duolingo.com	Lessons on 19 different languages through a series of unique learning modules with a game-like interface.	Supports basic conversational language skill acquisition through practicing pronunciation, practical vocabulary and grammar. The learning modules develop basic language skills: listening, speaking, reading, etc. Client List Unavailable
Content Libraries		
LinkedIn Learning *(formally Lynda.com)* (US) www.linkedin.com/	Video courses taught by industry experts in ICT, creative, and business.	Courses support pursuing learning paths and can allow users to pursue new careers. After subscription, courses are free and repeatable. Clients Include: Salesforce (www.salesforce.com), Arcadia University (www.arcadia.edu), Estee Lauder (www.esteelauder.com)

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Udemy **(US)** www.udemy.com	100,000 online video courses	Udemy can be used for training across an individual business and can also be used as a teaching platform. Clients Include: Booking.com (www.booking.com), Mercedes-Benz (www.mercedes-benz.com/), Adidas (www.adidas.com)
Khan Academy **(US)** www.khanacademy.org	Practice exercises, videos, and a learning dashboard allows learners to self-direct their studies in and outside of the classroom.	Self-paced learning fills learner knowledge gaps and then supports new user learning. Content, including assessment tools, is created by experts in math, science and more. Client List Unavailable.
Coursera **(US)** www.coursera.org	Top-quality, job-relevant distance learning at large scale.	Offers specializations; certificates; degree programs. It has wide recognition. Clients Include: Duke University (duke.edu), IBM (www.ibm.com), Stanford University (www.stanford.edu)
Knowledge Management		
SharePoint **(US)** www.microsoft.com	Integrated with Microsoft Office to ease document management and storage capacities.	User-generated repository of documents and files allows knowledge and content sharing across an organization, enabling learning and skill development. Clients Include: Nascar (www.nascar.com), Qantas (www.qantas.com), Marks&Spencer (marksandspencer.com)
KMSLighthouse **(US)** www.kmslh.com	Customized content uploading and creation to meet specific industry needs.	Integrates with existing company applications offering customizable content and providing users with AI-supported searches that generate quick answers and solutions, enhancing learning and development capabilities. Clients Include: DHL (www.dhl.com), Orange (www.orange.com), GE Healthcare (www.gehealthcare.com)
Digital Adoption and Workflow Learning		
WalkMe **(US)** www.walkme.com	Overlays all applications to allow businesses to monitor and gain insights into user behavior and to create and suggest in-application experiences.	Learning and assistance functions are triggered by behavior that has been predicted using AI. This allows the app to intervene at the point of need or the point of most effective intervention for just-in-time learning.

		Clients Include: Mastercard (www.mastercard.com), Oracle (www.oracle.com), Jobvite (www.jobvite.com)
EnableNOW **(US)** **www.sap.com**	Collaboratively manage and share various training.	Just-in-time support and training and it offers the ability for users to create online courses and create portals for explorative learning and knowledge acquisition. Clients Include: VINCI (www.vinci.com), CHS.Inc (www.chsinc.com), Vistex Inc. (www.vistex.com)
Apty **(IN)** **www.apty.io**	Integrates software and works with different web-based applications to track progress.	Provides on-demand support, and helps employees learn new software, reporting on data to help users identify learning opportunities. Clients Include: Boeing (www.boeing.com), Madison Logic (www.madisonlogic.com), TD Bank (www.td.com)
Learning Record Store		
GrassBlade **(IN)** **www.nextsoftwaresolutions.com**	Stores learner data just-in-time using xAPI content, and relies on quizzes, videos, games, simulations and more to gather data.	Customized dashboards and activity streams help track and prompt learning and skill development. Clients Include: Warner Brothers (www.warnerbros.com), Wake Forest University (www.wfu.edu),University Of Washington (www.washington.edu)
Learning Locker **(UK)** **www.ht2labs.com**	Connects systems together, showing training impact, helping users make informed decisions on learning design.	Pulls data and uses it to increase the creativity and reach of learning experiences. Clients Include: Hasselt University (www.uhasselt.be), Desjardins Group (www.desjardins.com), NeuroLeadership Institute (NLI) (neuroleadership.com)
Watershed **(US)** **www.watershedlrs.com**	Pulls data to analyze and identify learning and behavioral change	Tracks blended learning with self-directed learning, monitoring progress and reporting analytics back to the business client, allowing for evidence of ROI on learning. Clients Include: Visa (usa.visa.com), Verizon (www.verizonwireless.com),Caterpillar (www.cat.com)

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b. Experience

Company	Overview	Value Proposition
Collaboration Tools		
SAP Jam Collaboration (US) www.sap.com	Connects customers, partners, and employees to information and processes.	Improves HR processes by helping employees engage in ongoing online learning. Clients Include: Cargill (www.cargill.ca), Commerzbank www.commerzbank.com, CRH crh.com
Trello (US) trello.com	Share files, create and edit checklists, and track progress.	Smooths out the process of group work. Clients include: Google (www.google.com/), Kickstarter (www.kickstarter.com), and Fender shop.fender.com
Microsoft Teams (US) www.microsoft.com	Unified communication and collaboration functions, combine chat, video meetings, file storage, and collaboration tools.	Generate, edit, and share content, create teams to store project files, and chat and track projects. Clients Include: H&R Block hrblock.com, CSG International csgi.com, and Wells Fargo wellsfargo.com
Coaching/Mentorship Tools		
Noomii (US) www.noomii.com	Directory of coaches: (life, business, career, and executive).	Allows coach users to receive feedback—including a summary of their ideal client, a review of coaching expertise, and their listing location in the coaching directory. Clients Include: Leica Biosystems www.leicabiosystems.com, Tulane University tulane.edu, Greensill www.greensill.com
Together (US) www.togetherplatform.com	Supports best-practice workplace mentorship programs.	Set a customized learning goal and then to align it with a given company's core competencies and strategic goals. Clients Include: Randstad www.randstad.ca; Reddit www.reddit.com, and The Walt Disney Company thewaltdisneycompany.com.

Graduway (US) graduway.com	Engages alumni for mentoring, to support job seekers and career-advancing peers.	Connect alumni to their former classmates. Clients Include: Columbia University www.columbia.edu, Pepperdine University www.pepperdine.edu, and University Of Oxford www.ox.ac.uk.
Simulation Software (AR/VR)		
CoSpaces Edu (US) cospaces.io/edu/	Users create virtual 3D worlds, infographics, and tell stories through designing and producing exhibits and tours.	A creation toolbox to create anything in 3D, offering coding features. Client List Unavailable
zSpace (US) zspace.com	Interactive experience AR/VR technology in a proprietary hardware.	This company provides both software and hardware to activate AR/VR learning. Clients Include: Clark County School District www.ccsd.net; Rhode Island School www.risd.edu; and University of Saint Thomas www.stthomas.edu
AugThat! (US) augthat.com	Augmented reality content for schools.	Contents designed mainly for use in elementary schools, grades 1-8. Client List Unavailable
EON Reality (US) eonreality.com	Virtual reality to design, develop, and distribute lessons using AR and VR functionalities.	Platform allows for the creation of interactive AR and VR lessons without users having coding or advanced technological skills. Clients Include: Boeing www.boeing.com; UNIDO www.unido.org; Accenture www.accenture.com
Social-Emotional Learning (SEL) System		
Aperture Education (US) apertureed.com	Measure, strengthen, and support social-emotional competency growth in youth, grades K-12.	Data collection and reporting functions helps program administrators measure SEL programs and curriculum impact. Clients Include: Addison School District 4 www.asd4.org, BestSelf Behavioral Health, Inc. www.bestselfwny.org, and Humble Independent School District humbleisd.net
Peekapak (CAN)	Reinforces key concepts like empathy and respect through a series of activities aligned by SEL objectives.	This platform offers classroom PRO and library licenses to guided reading-leveled print books, after-school programs, and pre/post SEL surveys.

www.peekapak.com		Clients Include: Denver Public Schools www.dpsk12.org, The School District Of Philadelphia www.philasd.org, and Chicago Public Schools cps.edu
Online Chat / Sharing		
Slack (US) slack.com	Collaboration tool that has chat rooms, private groups, direct messaging, and searchable content storage.	Users create and share content, and comment and collaborate in multiple communication modes and threads. Clients Include: Royal Bank Of Canada www.rbcroyalbank.com, Hubspot www.hubspot.com, Vodafone www.vodafone.com
Skype for Business (US) www.skype.com	This application offers text, voice, and video call functions.	Users can use text channels to chat, share files, and connect virtually over video. A maximum of 50 people can participate in each chat. Clients Include: Wells Fargo wellsfargo.com, The Hartford thehartford.com, and Reyes Holdings reyesholdings.com
Zoom (US) zoom.us	This application offers text, voice, and video call functions.	Video chat channels can host up to 100 people, though this is limited to 40 minutes in the free version. Clients Include: Berkeley University Of California www.berkeley.edu, Capital One www.capitalone.ca and Western Union www.westernunion.com

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c. Exposure (inspired by Bersin model)

Company	Overview	Value Proposition
Social Networks		
Facebook **(US)** www.facebook.com	Users connect with friends and family and meet new people on peer network.	It allows users to share information by text, or through video or photos. It is not designed for professional settings and information shared would typically be personal. Client list unavailable
Instagram **(US)** www.instagram.com	Users share photos and videos, and minimal text sharing.	Users can share more personal videos and photos and interact with other users by liking or commenting on photos/videos. Client list unavailable
Meetup **(US)** www.meetup.com	Users create and sort online groups to host in-person meetings for people who share interests.	Users can be members of multiple groups or can RSVP for unlimited numbers of events to find friends, share a hobby, or network professionally. Client list unavailable
Professional Social Networks		
LinkedIn **(US)** www.linkedin.com	Platform used for professional networking purposes, including for job posting and job seeking.	Users can make profiles and connect through chatting or other forms of connections. Client list unavailable.
Fishbowl **(US)** www.fishbowlapp.com	Professional social network helps users connect within an industry, often between companies.	Users find a community that helps them develop their skills and capacities through providing them mentorship, advice, and teaching them empathy. Client list unavailable.

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Social Learning Platforms		
Tovuti (US) www.tovutilms.com	Cloud-based solution that allows for creating, delivering, and tracking online training and education.	Offers personalized learner portals, courses, integrated course libraries, event management and reporting Clients include: The Education Partners (Clients include www.theeducationpartners.com/), The Mortgage List (Clients include www.themortgagelist.com/), Vintory (Clients includevintory.com/)
Edmodo (US) new.edmodo.com/	Learning management platform augments classroom learning with social learning for students and teachers in K-12.	Platform is set up like a social networking feed allowing students, teachers and parents to communicate with posts, and other users can comment or like, similar to Facebook. Clients Unavailable
Video Content Platforms		
Vimeo (US) vimeo.com	Enterprise video platform built to host and provide full high-definition videos with presentation customization.	Users can share content (e.g. training/learning videos). Admins can view how many views, shares (if enabled) the video content has. Clients Unavailable
YouTube (US) www.youtube.com	Video sharing platform allows users to upload, view, share, and rate video content.	Platform houses videos that can assist with skill development and users can create channels and have subscribers. Clients Unavailable
Vidyard (CAN) www.vidyard.com	Video platform that businesses use to transform communications and drive more revenue through strategic use of online videos.	Enterprise video platform built to turn viewers into customers with in-depth insights and robust integrations with different customer relationship management (CRM) and marketing automation platforms. Clients include: Microsoft (www.microsoft.com), LinkedIn (www.linkedin.com), Hubspot (www.linkedin.com)
Echo360 (US) echo360.com	A video platform designed to foster active, engaged and personalized video-based learning.	Platform uses cases and teaching methods such as lecture capture, flipped classrooms, campus video library, video accessibility and more. Clients include: Coventree University (www.coventry.ac.uk), McMaster University (www.mcmaster.ca), Queens University (www.queensu.ca)

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2. Accessing Skills

a. Sourcing

Company	Overview	Value Proposition
Peer to Peer Recruitment		
HireUp **(AU)** hire-up.io	Platform streamlines a business's employee referral program, allowing employees to share jobs.	New hires are sourced via referral programs which results in producing 25 percent more profit for their companies. Clients Unavailable
FirstBird **(AT)** www.firstbird.com	Employees can become brand ambassadors, and use referrals for recruiting.	Platform allows tapping into employee networks resulting in accessing the passive labor market. Clients Include: T-Mobile (www.t-mobile.com), Volkswagen (www.volkswagen-groupservices.com/) , Accor Hotels (group.accor.com/en)
Drafted **(US)** explore.drafted.us	Platform indexes a graph database of the entire company network, using AI to recommend candidates for open roles.	Extensive employer filters allow businesses to search for candidates with specific skills or in specific industries. Clients include: Wayfair (www.wayfair.com), Better Mortgage Corporation (better.com), LogMeIn (www.logmein.com)
Social Search		
TalentBin **(US)** www.talentbin.com	Platform allows recruiters to access the world's largest passive candidate database.	Automates the process of passive candidate recruiting by aggregating social media data to find and engage candidates with the right skills. Clients include: VigLink (www.viglink.com), Gartner (www.gartner.com), WHO iHR (hwww.who.int)
Human Predictions **(US)** humanpredictions.io	Platform that gathers public data and uses machine learning to predict employee trends.	Platform creates robust data profiles allowing businesses to search for broader skills in tech Clients include: Groupon (Groupon.com), IDEO (www.ideo.com), KnowledgeHound (www.knowledgehound.com)

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Entelo **(US)** www.entelo.com	Platform has compiled the most comprehensive talent database of over 500 million individuals	Entelo allows businesses to gain access to data points and skills not found in traditional resumes, such as a candidate's career highlights and progression, company fit, their likelihood of switching jobs, and details yielding their market value. Clients include: Lyft (www.lyft.com), Paypal (paypal.com), Asana (asana.com)
Temporary Labour Marketplace		
Gigster **(US)** gigster.com	This freelance market of select app developers allows for the assembly of entire teams.	Platform pulls developers from top-tier schools such as MIT and Stanford to an invite-only platform. Clients include: IBM (www.ibm.com/), Mastercard (www.mastercard.ca/), Wondery (wondery.com)
Upwork **(US)** www.upwork.com	Global freelancing platform connects top talent and agencies around the world.	Platform allows freelancers to work on projects from web and mobile app development to SEO, social media marketing, content writing, graphic design, admin help and thousands of other projects. Clients include: Microsoft (www.microsoft.com/), Airbnb (www.airbnb.com), Bissel (www.bissel.com)
Toptal **(US)** www.toptal.com	This exclusive network boasts a rigorous screening process that identifies the top 3% of experts with elite industry experience.	Platform uses a variety of ways to screen for skill and proficiency, including portfolio reviews, technical coding challenges, user or market research, business cases, etc. Clients include: Airbnb (www.airbnb.com), Duolingo (www.duolingo.com), Shopify (www.shopify.com)
TaskRabbit **(US)** www.taskrabbit.com	Same-day service platform instantly connects users with skilled Taskers to help with odd-jobs and errands.	Largest platform for home service sectors Clients Unavailable
Crowd Source Recruitment		
99designs **(AU)** 99designs.ca	Global creative platform of freelance designers.	Platform allows outsourcing of creative strategy and marketing. Clients include: Forbes (www.forbes.com), National Post (nationalpost.com), Wall Street Journal (www.wsj.com)

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Zooppa (US) www.zooppa.com	Connects creatives (filmmakers and graphic artists) with big brands.	Platform allows outsourcing of design skills, and closes often large gap between creatives and big name companies. Clients include: Reebok (www.reebok.com) , Jeep (hwww.jeep.com), Nestle (www.nestle.com)
Topcoder (US) www.topcoder.com	Global community of designers, developers, data scientists and programmers	A crowdsourcing company with an open global community of designers, developers, data scientists, and competitive programmers. Clients include: Fujitsu (www.fujitsu.com), Spacenet (spacenet.ai), Harvard Medical School (hms.harvard.edu)
MindSumo (US) www.mindsumo.com	Leading crowdsourcing platform for Millennial & Gen Z problem solvers.	Community represents over 350,000 "problem solvers" from six continents and over 3,000 universities. Clients Include: Shell (www.shell.com), Deloitte (www2.deloitte.com), Pepsi (www.pepsi.com)
Job Board and Job Board Aggregators		
Snag (US) www.snagajob.com	Website and app that profiles the hourly or part-time market.	App matches candidates with jobs that are a good fit for their skills. Specializes in non-salary positions with often specific skills. Clients include: TGI Fridays (www.tgifridays.com), Popeyes (www.popeyes.com), Pizza Hut (www.pizzahut.ca)
Switch (US) www.switchapp.com	Job matching app utilizing a unique matching algorithm to analyze job seeker data.	App allows candidates to upload their resumes but remain anonymous while searching. Clients include: Facebook (hwww.facebook.com), Ebay (www.ebay.com), Wikipedia (www.wikipedia.org)
College Recruiter (US) www.collegerecruiter.com	Leading niche job board for college and university students.	Platform allows students to capitalize on skills gained directly in degree programs to match them with available job opportunities. Clients include: Scotiabank (www.scotiabank.com), Luxottica (www.luxottica.com), Fraser Health (www.fraserhealth.ca)

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Glassdoor **(US)** www.glassdoor.com	Users can anonymously review companies, and submit and view salaries.	Website focuses on job-seeker experience by providing authentic and trusted reviews of potential employers. Client list unavailable.
Indeed **(US)** www.indeed.com	Website and app that aggregates job listings from thousands of websites.	Market leader for jobs and employment with over 250 million unique visitors per month. Client list unavailable.

b. Skills Mapping

Company	Overview	Value Proposition
AI Skills Mapping		
FutureFit **(CAN)** www.futurefit.ai/	AI-powered Future of Work start-up that uses purpose-built and research-backed predictions to discover future-proof skills and careers.	Platform's Intelligence model enables companies, governments, and agencies to develop more intelligent strategies Clients include: OECD (Clients includewww.oecd.org/) and IBM (www.ibm.com)
Vervoe **(US)** vervoe.com	AI-powered skill testing and evaluation product grades candidates based on how well they can perform the job they are applying for.	Platform makes hiring inclusive by screening everyone and allowing the applicants to showcase their talents, increasing hiring diversity and inclusion. Clients include: Walmart (www.walmart.ca/), FDM (fdmgroup.com), myob (www.myob.com)
Plum.io **(CAN)** www.plum.io/	Platform helps employers hire, grow, and retain employees by providing AI driven insights.	Platform allows employers to select for certain skills through hiring surveys and AI analytics. Clients include: Deloitte (www2.deloitte.com), Scotiabank (www.scotiabank.com/), Communitech (www.communitech.ca/)

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3. Skills Gapping

a. Skill identification (defining what skills are, or will be required)

Company	Overview	Value Proposition
Workforce Analytics		
MicroStrategy (US) www.microstrategy.com/us	A Human Resources analytics tool.	Products and services allow users to identify and assess skills gap and then view development opportunities. Clients include: Adidas (www.adidas.ca), Coca-Cola (www.coca-cola.com/), Merck (www.merck.com)
Crunchr (EU) www.crunchrapps.com/products	Workforce product gives organizations predictive insights using data-driven and analytic approaches.	A cloud solution for workforce planning and employee analytics, enabling organizations to confirm employee skill relevance and ensure employee development alignment with larger strategy. Clients include Randstad (www.randstad.ca/), Volvo (www.volvocars.com/), GrandVision (www.grandvision.com/)
Foresight (EU) **Url not found**	An HR analytics tool, allowing managers to understand future people gaps and to mitigate performance risks.	Platform allows organization to understand talent potential, which organizations can respond to with learning opportunities. Clients Unavailable

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b. Gap Assessment (Identifying the skills gap within the organization)

Company	Overview	Value Proposition
Skills Gap Analysis		
Gyrus (US) www.gyrus.com/features	This platform aims to close the skill gap by providing skill deficiency recognition.	Main objective is to build personalized, accessible, and meaningful learning journeys for employees. Client include: Caterpillar (www.caterpillar.com), U.S. Airforce (www.airforce.com/), Magna (www.magna.com/)
Avilar (US) www.avilar.com/webmentor/	Skills management software that helps organizations identify, analyze, and manage skills gaps, enabling workforce planning.	Software allows assessment of current landscape of skills and option to develop blueprint for future improvement. Client list unavailable.

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c. Skill-Position Mapping

Company	Overview	Value Proposition
Skills Mapping		
SoftExpert HDM (US) www.softexpert.com/	Platform allows for competency mapping, training and development, and succession planning.	Provides training programs that identify and address skill gaps for employees. Clients include: BRF (www.brf-global.com/en/), Royal Canin (www.royalcanin.com), Engie (www.engie.com/)
MapSkiller: Competency Mapping Tool (US) devskiller.com/mapskiller/	Enables organizations to assess each employee's unique skill set and develop training programs to fill gaps.	Features include showing skill progressions and prerequisite skills required to build new skill set and mapping skills of each employee to encourage professional development. Clients unavailable.
SkillMap (IN) www.skillsmap.io/	Platform communicates required skills and behaviors, identifies and addresses gaps, and provides actionable guides to reaching learning goals.	Features allow user understanding of their capabilities, as assessed from completed evaluations. Clients include: Carwow (www.carwow.co.uk/), Unruly (unruly.co/), Times Higher Education (www.timeshighereducation.com/)
Centranum (NZ) www.centranum.com/	Talent management software developed on the basis of workplace psychological research.	Integrates capability tracking, job expectations, continuous performance management, and competency development. Clients include: Singapore General Hospital (www.sgh.com.sg/) and North Harbour Health (url not found)

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4. Skills Assessment

a. Measurement (defining and collecting metrics)

Company	Overview	Value Proposition
Skill Benchmarking/ Online Skill Assessment		
The Predictive Index (US) www.predictiveindex.com/	Global leading talent optimization platform, using Cognitive and Behavioural Assessments.	Platform focuses brings to the fore behavioural and cognitive skills such as dominance, patience, extraversion, etc. Clients Include: Vmware (www.vmware.com/), IBM (www.ibm.com/), AutoNation (www.autonation.com/)
eSkill (US) www.eskill.com/	Testing platform providing industry-leading skill tests to verify candidate skill sets and identify training gaps.	Testing allows organizations to identify and address knowledge gaps to address employee learning needs and help skill up employees effectively. Clients Include: Caterpillar (www.caterpillar.com) and AT&T (www.att.com/)
The Athena Quotient (US) athenaq.com/	Program provides measurement of employee judgement, measuring improvements in sound business decision-making.	Soft-skill focus, recognizing that judgement is paramount in making business decisions and should be valued similar to technical capabilities. Clients Include: Baylor College (www.baylor.edu/), Samaritans Purse (www.samaritanspurse.ca/), Oracle (www.oracle.com/)
HackerRank (US) www.hackerrank.com	Online, role-specific, technical assessment platform.	Platform allow testers to benchmark their skills in reference to industry requirements to verify or improve their skill sets. Clients include: Booking (www.booking.com/), Goldman Sachs (www.goldmansachs.com/), Linkedin (ca.linkedin.com/)
SkillRobo (US) www.skillrobo.com/	Pre-employment testing and online assessment software.	A product that allows candidates to have the opportunity to self-develop learning pathways based on feedback received from tests. Clients include: SkillUp (skillup.africa/), Inovar Consulting (inovarconsulting.co.in/), India Health Link (indiahealthlink.com/)

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b. Credentialing

Company	Overview	Value Proposition
Online Certifying Bodies ePortfolios/ Badging		
LinkedIn Skills Assessment ("Quizzes") **(US)** Linkedin.com	Platform allows users to validate and showcase existing skills proficiencies to become more discoverable to recruiters.	Offers technical, business and design skills assessments. Badges highlight skills to potential employers. Clients Unavailable
Credly **(US)** credly.com	Platform helps businesses design unique achievement recognition system of demonstrated competencies and skills.	Businesses gather data around badges issued to evaluate interests/achievements, identify leaders, and use this information to inform new programs, and new learning for skill development. Clients include IBM (www.ibm.com/), Oracle (www.oracle.com/), Pearson (www.pearson.com/)

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5. Diverse Skills Utilization

a. Skills Matching

Company	Overview	Value Proposition
Biased-free recruitment		
Magnet (CAN) https://magnet.today/	Inclusive Canadian platform leader connecting 1.1 million job seekers with 500,000 employers.	Platform removes employment barriers for skilled workers, tailoring job postings to match required skills and qualifications. Clients include: Government of Canada (Canada.ca), Government of New Brunswick (www2.gnb.ca), Province of Ontario (www.ontario.ca/)
Blendoor (US) https://blendoor.com/	Uses people analytics and augmented intelligence to prevent bias in hiring process.	Centers skills at the forefront of a job application by using AI technologies to source and filter candidates. Clients include Salesforce (salesforce.com), Google (google.ca/), Air BnB (airbnb.ca/), Amazon (amazon.com/)
Bryq (GR) https://bryq.com/	Offers bias-free hiring, assessing candidates on cognitive skills and personality traits.	Matches jobs to strengths and cognitive skills by creating psychometric profiles of candidates. Clients include: Upstream (www.upstreamsystems.com/), Persado (persado.com), COSI (www.cosi-group.com/)
Demand-side Upskilling with Accessibility and Inclusion focus		
Employ Diversity (US) https://employdiversity.com/	Solution connecting diverse job seekers with companies recruiting multicultural and foreign employees.	Provides resources, webinars, and diversity insights to help businesses attract talent from diverse populations. Clients include: The 360 Group (the360group.us/), The Management Center (www.managementcenter.org/), PL+US (paidleave.us/)
Jopwell (US)	Career advancement platform that connects Black, Latinx, and Native American professionals and students with partner companies.	Enables customized profiles of partner companies to promote workplace culture, opportunities, overall commitment to diversity.

https://www.jopwell.com/		Clients include: Goldman Sachs (www.goldmansachs.com/), Bloomberg (www.bloomberg.com/), Spotify (https://www.spotify.com/), American Express (https://www.americanexpress.com/)
Out and Equal **(US)** https://outandequal.org/	Provides LGBTQ executive leadership development, diversity training, and professional networking opportunities to create inclusive work environments.	Helps employers attract the right talent by minimizing bias, and works with internal leaders to raise equity concerns that may impact retention and attraction. Client lists not available.
Biased-Free Assessment		
Lumina Learning **(UK)** https://luminalearning.com/	Platform conducts personality assessments and removes bias that may be present in other psychometrics.	Provides individuals with personalized readings of strengths and practical actions to improve developmental areas. Clients include: European Investment Fund (EIF) (www.eif.org/), Adidas Group (www.adidas-group.com), LIXIL (www.lixil.com/)
GapJumpers **(US)** https://www.gapjumpers.me	Platform designed to screen candidates by creating challenges to evaluate based on work performance, removing resumes and inherent biases involved.	Enables capability based recruiting through “blind auditions” for jobs focusing on skills and minimizing bias. Clients include: Mozilla (www.mozilla.org/), Dolby(www.dolby.com), Chegg (www.chegg.com/)
Pymetrics **(US)** https://www.pymetrics.ai/	Applies AI to identify talent bias-free and predict job performance based on analysis of neuroscience data.	Makes hiring more fair by creating and distributing assessments that work for people who need a range of accessibility accommodations. Clients include: Unilever (www.unilever.com/), Accenture (www.accenture.com/), Workday (www.workday.com/)
Weirdly **(NZ)** https://www.getweirdly.com	Offers pre-employment quizzes to build diverse teams and to differente candidates.	Speeds up screening processes by prioritizing the assessment of soft skills, values alignment and culture. Clients include: Uber (www.uber.com/ca/en/), Target (www.target.com/) , Sodexo (ca.sodexo.com/)

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