Building a Common Language for Skills at Work

A Global Taxonomy

January 2021

WORLD ECONOMIC FORUM

Preface

The combination of the ongoing COVID-19-related global recession and increased automation in the future of work has led to a large-scale disruption of the jobs and skills landscape. While previous generations of talent could expect linear career progression and engagement in formal learning that decreases over time, the workforce of the future will be required to rapidly learn and relearn new skills as reskilling, upskilling and redeployment define the 'new normal' in the future of work.

Current systems of learning and signalling job-fit do not provide the agility that lifelong learners will require, and we find ourselves at a defining moment to make skills the currency of the labour market. Shifting to a skills-based system can not only provide more efficient mechanisms by which employers can identify the talent they need for business to flourish but can also create fairer labour markets where individuals are able to rapidly transition between roles; have greater access to learning opportunities; and be matched to employment through unbiased and skills-based evaluation. Yet many learning providers and employers use their own definitions and standards for skills, creating additional challenges for connecting workers to learning opportunities.

Over the past year, the World Economic Forum has brought together several communities of influential leaders committed to the Reskilling Revolution—an ambitious goal to provide 1 billion people with improved education, jobs and skills by 2030. These communities include Ministers of Education and Labour, Chief Executive Officers, Chief Human Resource Officers, Chief Learning Officers, online learning providers, and key industry and country-level skills experts and leaders—all of which have committed to creating more efficient and fairer labour markets by more closely aligning the supply and demand of learning.

The following proposed framework for a global skills taxonomy is a first step in shifting toward a skills-based labour market. We hope that the principles for implementation herein will serve to further align learning supply and demand around a common language for skills and unlock the Reskilling Revolution. The proposed taxonomy builds on the recognized work taken forward by ESCO (European Skills, Competences and Occupations) and the Occupational Information Network (O*NET) framework by integrating additional emerging skills and attitudes, particularly as they relate to the trends highlighted in the Forum's ongoing insights on the future of work. It aims to take a matrixed approach that combines skills and occupations.

This taxonomy focuses on the skills that we know to be of growing relevance in a fast-changing labour market, and aims to serve as a "universal adapter" for existing taxonomies across learning supply and demand by allowing users to cross-walk their taxonomy against this framework. It is designed to be used by Chief Learning Officers in developing their learning, reskilling and redeployment strategies; by Chief Human Resource Officers in their practices for hiring incoming talent; by learning providers who design and curate learning materials to be used in the workforce; and by governments who aim to assess skills needs within their economies. The ambition is that—through continuous contributions and consultations with industry and government experts—we continue to build on this framework to ensure it remains agile and adapts to broader disruptions and changing trends in the jobs and skills landscape. This publication complements the global skills taxonomy by providing context and recommendations for how the taxonomy can be deployed by key actors to unlock the Reskilling Revolution.

For more information, or to get involved, please contact the World Economic Forum's New Economy and Society team at reskillingrevolution@weforum.org.

The COVID-19 pandemic and related ongoing global recession have transformed the global jobs and skills landscape.

These shifts have accelerated the need for reskilling, upskilling, learning and redeployment at scale.

50%

of all employees will need reskilling by 2025.

Source

The Future of Jobs Report 2020, World Economic Forum.

40%

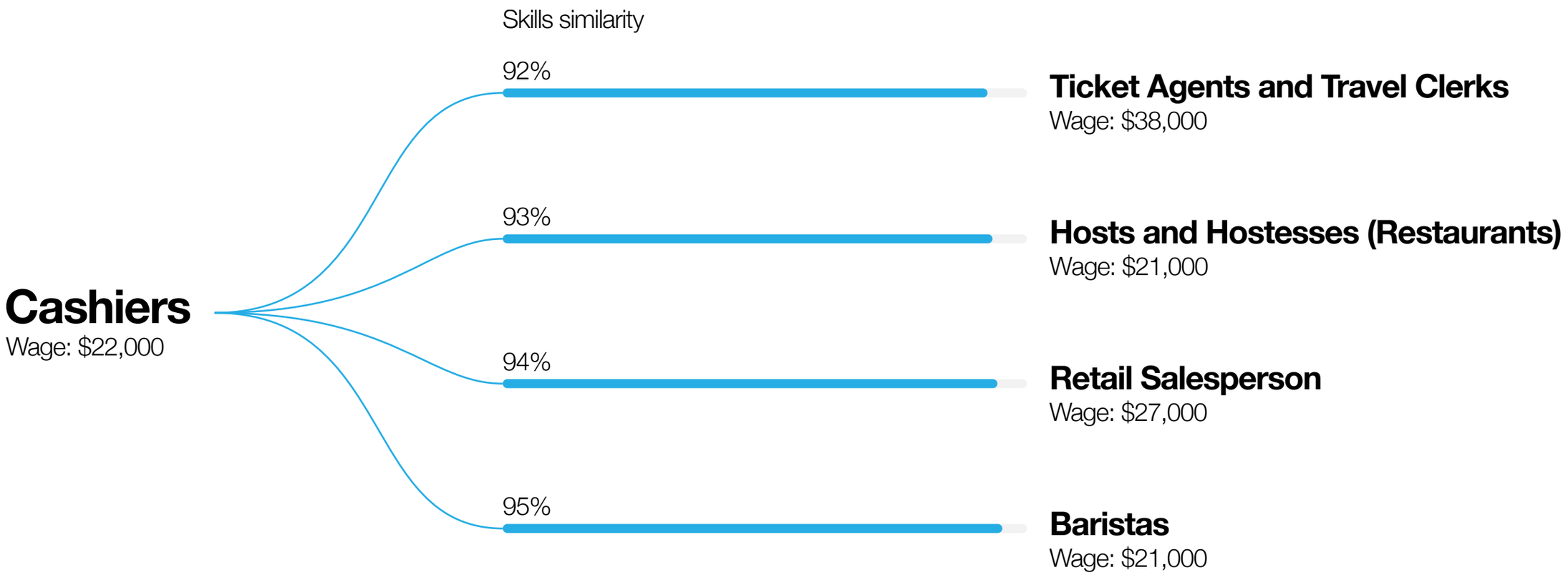
of current workers' core skills are expected to change in the next 5 years.

Source

The Future of Jobs Report 2020, World Economic Forum.

New data-driven methods demonstrate the power of using a skills-based approach to reskill, upskill and redeploy talent. Breaking job roles down into required skill sets can allow employers to better understand viable job transition pathways based on the level of similarity in the skills required for different roles, and can enable employers to make more informed decisions on the kind of reskilling and upskilling required to support those transitions.

Below is an example of viable reskilling pathways for cashiers based on a skills match of at least 85% between potential new professions.



Source

World Economic Forum, *Towards a Reskilling Revolution: Industry-Led Action for the Future of Work*, 2019.

Aligning around a common language for skills can unlock a Reskilling Revolution by enabling more efficient collaboration between learning providers, employers and governments to reskill, upskill and redeploy talent.

This proposed global skills taxonomy consists of:

1 Definitions

A set of definitions and differentiations of commonly used terms

2 Categorizations

A categorization of skills clusters and groupings at various levels of granularity

3 Recommendations

Mechanisms for adoption in assessment, hiring, learning and redeployment practices

4 Use Cases

Examples of how the taxonomy has already been leveraged to lead the Reskilling Revolution

Why Develop a Common Skills Taxonomy?

Aligning on a global skills taxonomy is the first step toward making skills the currency of the labour market, which will pay off for individuals, businesses and governments.

Finding the right talent

Aligning on a common language for skills will enable businesses to more rapidly and effectively identify the right talent to fill emerging roles needed for businesses to flourish. In fact, a study found that using a skills-based approach to hiring predicted job success for entry-level employees five times better than degree requirements.[1]

A global skills taxonomy may also enable greater intra- and cross-industry collaboration on redeployment efforts—efficiency that is much needed in the context of large-scale unemployment caused in part by COVID-19. Furthermore, a common taxonomy will enable learning providers to more effectively deliver on training needs to prepare talent for the future of work.

Building fairer, more diverse labour markets

Traditional degree-based hiring practices can potentially exclude diverse and relevant talent from the workforce. Aligning on a common language for skills will enable employers to better understand workforce needs and hire based on skills acquisition, rather than on social factors such as networks and access to recognized institutions. Further, taking a skills-based approach can help reduce bias in hiring practices and enable new pathways to employment by allowing nontraditional candidates to be considered for employment. This approach can in turn boost an organization's talent pool diversity, which many studies have linked with increased innovation.

1 Definitions

Aligning on a common set of definitions and differentiations of terms used to describe skills is a critical first step in building a global skills taxonomy. Shared terminology reduces inefficiency when matching the supply and demand of competencies, and provides a framework by which specific skills, knowledge, attitudes and abilities may be categorized. The proposed definitions of key terms are based on a comprehensive literature review that is informed by key skills experts. These definitions form the foundation for the taxonomy framework. Given that the taxonomy is to be used in the context of jobs, skills and knowledge have been combined for this framework. Further skills definitions can be found in the appendix.

Competencies — Collection of skills, knowledge, attitudes and abilities that enable an individual to perform job roles

Skills and Knowledge

Skills are the capabilities needed to complete a task, and therefore a job.

Knowledge is the body of facts, principles and theories that are related to a field of work or study, and that can be further split into dependent knowledge (practical and procedural) and context-independent or theoretical knowledge.

Attitudes

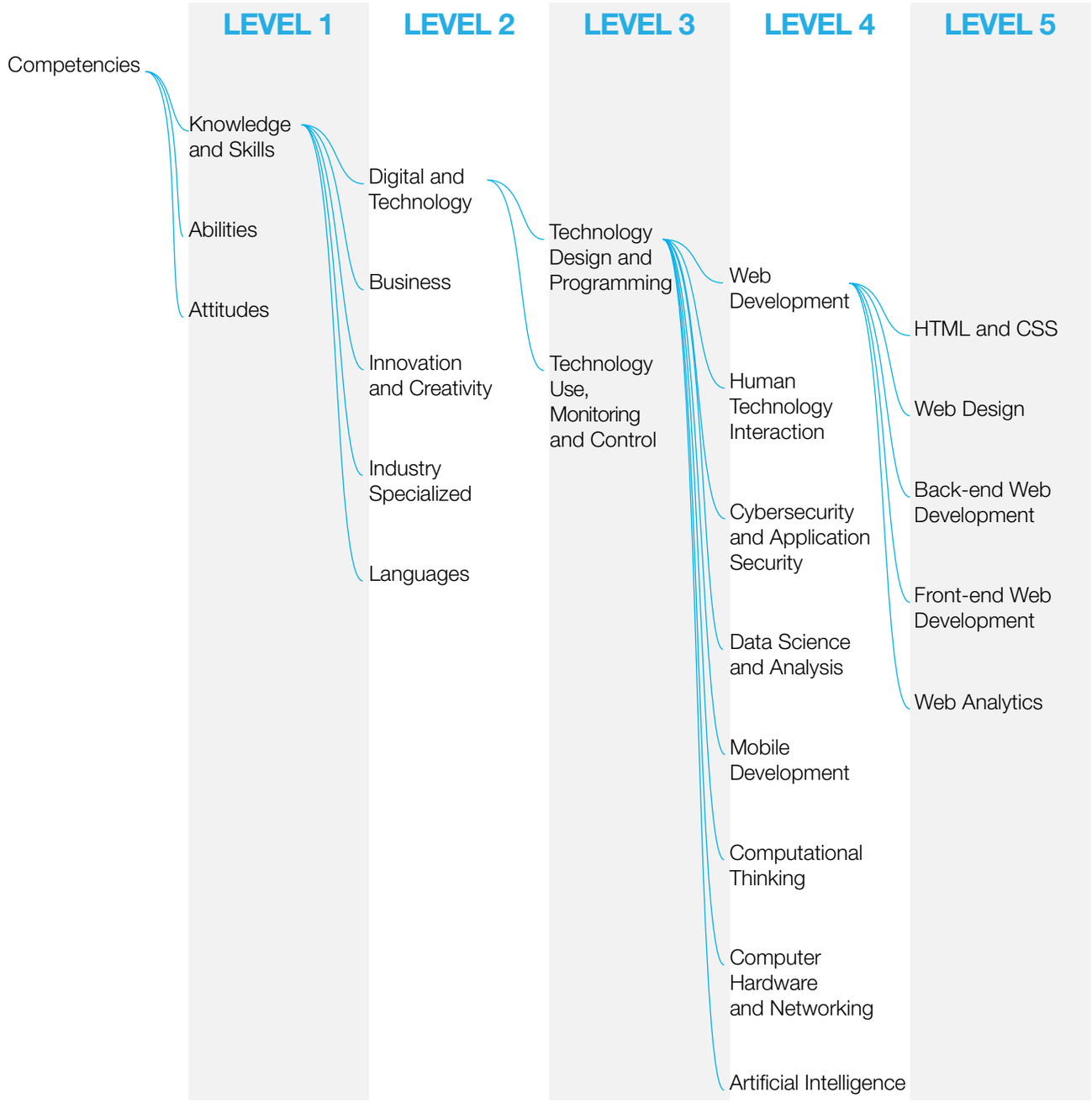
Learned behaviours, emotional intelligence traits and beliefs that individuals exhibit that influence their approach to ideas, persons and situations.

Abilities

Possession of the physical, psychomotor, cognitive and sensory means to perform a job.

2 Categorizations

Clustering skills at various levels increases the taxonomy's efficacy and reach by enabling employers and learning providers to map their own taxonomies against the global framework. Using data-driven and qualitative methods, skills may be clustered according to similarity. Granularity increases with each level, with levels 1-3 remaining constant as the foundational framework; level 4 providing opportunities for adding skills as the skills landscape continues to transform; and level 5 being determined by the end user of the taxonomy (i.e. employers, learning providers and governments). Users can essentially "plug in" their own taxonomy at level 5. The following is an example of what clustering may look like for digital and technology skills. The full proposed taxonomy can be found here.



3 Recommendations

While this taxonomy is meant to be a living document that is continuously updated to reflect the transforming nature of today's labour markets, its implementation can and should be immediate to deliver on the urgent needs of the global labour market.

The following is a set of recommendations aimed at individuals, employers, learning providers and governments for adopting this global skills taxonomy for use in hiring, learning, development and redeployment practices.

Commit

Build the case among business and government leadership, understand current skills gaps, set targets and communicate the benefits of adopting a common skills taxonomy.

- Ensure buy-in at the top
- Assess skills needs
- Communicate your rationale

Embed

Embed change by adopting new skills-based hiring, learning and development practices, and by creating opportunities for individuals to take ownership of their skills-based lifelong learning journeys.

- Rewrite job descriptions
- Adopt new hiring practices
- Create skills-based progression opportunities
- Adopt new learning and development practices

Mainstream

Mainstream skills-based practices across industries, countries and globally by raising awareness among the general public of the benefits of aligning around a common taxonomy.

- Leverage new technologies
- Partner with vocational training and higher education institutions
- Adopt within public-sector institutions

Commit

Ensure buy-in at the top

Leadership buy-in is a key component in the successful adoption of the global skills taxonomy. Employers, learning providers and governments should become champions of mainstreaming a common language for skills, setting the tone for their organizations, employees, and economies, and demonstrating their commitment to building fairer labour markets. Champions can show their commitment to skills-based labour markets by describing the skill set that enables them to be successful in their roles.

Assess skills needs

Leverage the common skills taxonomy to understand the skills gaps within your company or economy. Partner with skills assessment platforms to track and measure skills trends in line with the taxonomy. Map out specific learning needs within your company or economy against specific business and economic strategic priorities.

Communicate your rationale

A study found that using a skills-based approach to hiring predicted job success for entry-level employees five times better than degree requirements.[2] Yet many employers shut out candidates based on their chosen education pathways, creating a biased labour market in favour of those with access to prestigious education institutions rather than individuals with the necessary skills. Skills-based hiring and learning is not yet a mainstreamed concept for individuals, employers, learning providers and governments. The business and the ethical cases for skills-based hiring must be widely communicated and understood among the broader public in order to encourage everyone to adopt a common language for skills.

Embed

Rewrite job descriptions

The taxonomy should be leveraged to update job descriptions to ones that advertise bundles of skills, rather than roles with specific degree requirements. The same should be done for existing employees to assess whether those in their current roles are best placed to complete the tasks in their roles. Employers should determine the proficiency level required for each skill to complete work-related tasks.

Adopt new hiring practices

Degree requirements could be entirely removed as prerequisites for interviewing potential candidates. Instead, employers could partner with skills assessment platforms to evaluate potential candidates based on their specific skill sets. Employers may leverage the proficiency levels outlined in the taxonomy.

Create skills-based progression opportunities

Skills should be continuously and precisely assessed in order to reduce bias in progression and remuneration opportunities and provide tailored, unbiased and skills-based feedback for employees. Employers may keep track of skills development via company-level skills passports based on the global skills taxonomy.

Adopt new learning and development practices

Chief learning officers and other leaders responsible for curating learning may leverage the taxonomy to identify learning content that is aligned with their reskilling, upskilling and broader learning needs. Definitions can be leveraged to efficiently communicate needs to learning providers in order to curate learning experiences that address skills gaps within organizations.

Mainstream

Leverage new technologies

A host of platforms are emerging within the education technology sector that enable faster and more accurate skills assessment, hiring and talent-matching. These new technologies should be aligned to the common taxonomy and could be leveraged to support efforts to mainstream skills-based systems.

Partner with vocational training and higher education institutions

TVET (Technical and Vocational Education and Training) and higher education institutions could leverage the taxonomy in partnership with employers to ensure that incoming talent is prepared with the specific skills needed to be successful in the labour market. Curricula and learning pathways could be adapted to focus on specific skills development rather than being geared toward roles and degrees.

Adopt within public-sector institutions

Primary and secondary education institutions should refer to the taxonomy when developing curricula to ensure that childhood learning is aligned to future employment skills requirements. Similarly, employment agencies and other public-sector institutions designed to support unemployed workers should leverage the taxonomy to match workers to potential employment opportunities.

④ Use Cases

The following is a set of examples of how the taxonomy has been leveraged to support reskilling, upskilling and redeployment efforts at the company, industry, and country levels. We hope that these may serve as concrete examples of how the taxonomy could continue to support scaling of the Reskilling Revolution.

Forecast global, country, industry and job skills trends

The taxonomy has been leveraged to forecast skills trends at the global, country and industry levels through both data-driven and qualitative efforts. At the global level, the taxonomy formed the basis of analysis for *The Future of Jobs Report 2020*. At the industry level, companies have leveraged the taxonomy to align on top emerging skills by industry. Alignment on these skills is supporting broader intra- and inter-industry reskilling and redeployment efforts.

Set common standards

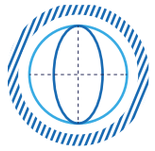
Industry-level communities have leveraged the taxonomy to define proficiency levels for top emerging digital and technology skills. Such alignment has supported their intra- and inter- industry efforts around reskilling, upskilling and redeployment, and enables them to more accurately assess skills and learning needs.

Create a common mapping of online learning

The taxonomy is currently being leveraged by communities that are part of the Forum's Reskilling Revolution initiative to map learning opportunities against learning needs. The mapping is based on specific skills as categorized in the taxonomy and allows employers and governments to easily understand offerings based on their skills needs.

Forecast Global, Country, Industry And Job-Specific Skills Trends

The taxonomy can be leveraged to provide forecasts for emerging skills. The following show skills trends projected through to 2025 at the global, country and industry level. These skills forecasts can inform decision-making around reskilling, upskilling and redeployment. The taxonomy may also be leveraged to understand how skills are changing within specific jobs. Here, for example, you will find a breakdown of emerging skills within the Data and AI job cluster.



Global Top 5 skills of 2025

1. Analytical thinking and innovation
2. Active learning and learning strategies
3. Complex problem-solving
4. Critical thinking and analysis
5. Creativity, originality and initiative

Industry Profile: Consumer Industry's Emerging Skills

1. Complex problem-solving
2. Analytical thinking and innovation
3. Active learning and learning strategies
4. Creativity, originality and initiative
5. Technology use, monitoring and control

Country Profile: Canada's Emerging Skills

1. Analytical thinking and innovation
2. Active learning and learning strategies
3. Technology design and programming
4. Critical thinking and analysis
5. Complex problem-solving

Data and AI

EMERGING JOBS

1. Artificial Intelligence Specialist
2. Data Scientists
3. Data Engineer
4. Big Data Developer
5. Data Analyst

TOP 5 SKILLS

1. Data Science
2. Data Storage Technologies
3. Development Tools
4. Artificial Intelligence
5. Software Development Lifecycle (SDLC)

Set Common Standards

The taxonomy may be used to define proficiency levels for emerging skills, which can enable individuals, employers and learning providers to better assess skill levels and gaps, and help learning providers better align content to talent needs. The following proposed proficiency levels for Machine Learning was developed in collaboration with employers and key skills experts.

Skill Name	Machine Learning (level 5)		
Skill Descriptor	Designing systems that learn from data and apply learning to new contexts		
Skill Descriptor by Proficiency Levels	**Foundational**	**Experienced**	**Advanced**
	– Understanding and classifying the type of problem and potential techniques – Processing data by collecting, cataloguing and validating data and sources – Selecting and implementing appropriate algorithms and models – Conducting training tests and executing training data to validate model	– Identifying problems, recommending hypotheses and potential solutions – Reviewing data set to ensure that data is sufficient and meaningful – Designing and building machine learning models based on problem statements – Designing and adapting training data sets to validate and improve the models – Providing recommendations from analysis gathered	– Synthesizing business insights to define problem areas and potential hypotheses – Defining the data engineering approach and guidelines based on data and business context – Spearheading development of new models or techniques to improvise existing models – Establishing training, testing and evaluation guidelines – Establishing model evaluation protocols, evaluating model results and ascertaining model deployment decisions

Create A Common Mapping of Online Learning

The taxonomy may also be used to map online learning opportunities and better facilitate the matching of learning supply and demand. The following is a sample of what such a mapping could look like, highlighting one example course per learning provider currently part of the Forum's Skills Consortium. A more comprehensive mapping could help employers and governments understand the opportunities for rapidly addressing skills gaps.

Taxonomy Level 2	Taxonomy Level 3	Taxonomy Level 4	Product Development Roles	Data and AI Roles	Care and Healthcare Roles
Digital and Technology and Skills	Technology Design and Programming	Artificial Intelligence			AI for Healthcare (Udacity)
		Computer Hardware & Networking	Build and Secure Networks in Google Cloud (Grow with Google)		
		Cybersecurity and Application Security		Introduction to AWS Identity and Access Management (IAM)	
		Mobile Development	Become an Android Mobile App Developer (LinkedIn)		
		Web Development	Build Your First Web Pages With HTML and CSS (OpenClassrooms)		
		Human-technology Interaction	UX Design Fundamentals (Coursera)		
		Data Science and Analysis	Beginner Python & Math for Data Science (Kaplan Professional)	Data Science: Machine Learning and Predictions (EdX)	Healthcare Payor Data Warehousing and Analysis (Infosys Wingspan)
	Technology Use Monitoring and Control	Software & Programming Languages	Introduction to Python Programming (Edraak)		
		Scientific Computing		Scientific Computing and Python for Data Science (WorldQuantUniversity)	

Appendix: Creating a Global Skills Taxonomy

Over the past several years, the World Economic Forum has convened experts and leaders to discuss trends in the future of work and catalyse industry- and country-level partnerships for reskilling, upskilling and talent redeployment. One of the key challenges confronted by these groups as they seek to scale impact on these topics is the lack of coordination across actors in relation to how skills are defined, especially in the context of new and emerging skills. This misalignment has led to inefficiencies in providing the right training to workers, redeploying talent within and across sectors, and assessing broader skill needs.

While several organizations have developed taxonomies for the purposes of research and labour market analysis, few have considered the practical functionality for end users such as job seekers, employers and learning providers. Over time, World Economic Forum communities have demanded an adaptive taxonomy that complements existing efforts, but that also considers newer and more industry-specific skills that have not yet been captured in other efforts.

Thus began an extensive consultation with Chief Learning Officers, Chief Human Resource Officers, online learning providers and skills and data experts in the Forum's New Metrics Network to understand the strengths and limitations of existing taxonomies; collect recommendations and suggestions for what particular skills require urgent alignment for industry and country-level efforts; and categorize skills according to what would be the most functional for the end user.

This taxonomy is also supported by a comprehensive review of existing frameworks, in particular the Occupational Information Network (O*NET) content model, the ESCO (European Skills, Competences and Occupations), and those developed by members of the World Economic Forum's Skills Consortium and Preparing for the Future of Work Industry Accelerators. Efforts were made to ensure that the global taxonomy leverages the most comprehensive elements of each individual taxonomy, while keeping user-friendliness at the core of the final product. In cases where differing definitions were provided for similar competencies, a synthesized definition was developed based on feedback from end users in the Forum's communities of employers and learning providers. While less comprehensive than other taxonomies in this initial phase, the Forum's taxonomy does aim to cover the latest emerging skills, with a view to continuously update and expand coverage as the skills landscape continues to transform.

The need for such a taxonomy was conceptualized in the World Economic Forum's 2019 report *Strategies for the New Economy: Skills as the Currency of the Labor Market*. In addition, this taxonomy is further informed by the World Economic Forum's *Towards a Reskilling Revolution: A Future of Jobs for All* report and the *2020 Future of Jobs Report*, which follows an adapted and synthesized version of the Occupational Information Network (O*NET) taxonomy for its categories of analysis for skills based on feedback and insights from New Metrics collaborators, as well as the data and research-driven methodology that was used in the World Economic Forum's *Jobs of Tomorrow: Mapping Opportunity in the New Economy* report to identify emerging occupations based on skills clusters. The methodology used in the *Jobs of Tomorrow* report was developed in collaboration with Burning Glass Technologies, Coursera and LinkedIn, which provided further insight into emerging skills categories and clusters. Insights from those collaborations have been integrated into the structure of the skills taxonomy presented in this report.

Level 1 Definitions	Level 2 Definitions	Level 3 Definitions	Level 4 Definitions
Skills and Knowledge: Skills are the capabilities needed to complete a task, and therefore a job. Knowledge is the body of facts, principles and theories that are related to a field of work or study, and that can be further split into dependent knowledge (practical and procedural) and context-independent or theoretical knowledge.	**Business**: Management and communication of activities. — **Source** World Economic Forum, *The Future of Jobs Report 2020*, 2020.	**Resource Management and Operations**: Capacity to allocate resources efficiently and effectively, and manage activities that businesses engage in daily to gain value from physical or intangible assets. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "resource management skills", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cresource%20management%20skills%E2%80%9D).	**Management of Personnel Resource**s: Capacity for gathering personnel resources to achieve tasks, including how human capital will be allocated to get the work done, identifying talent, and accounting for expenditures and returns. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "personnel management", https://ec.europa.eu/esco/portal/skill; O*Net Resource Center, *The O*NET® Content Model*, "management of personnel resources", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cresource%20management%20skills%E2%80%9D).
			Coordination and Time Management: Capacity to manage one's time and planning in tandem with others. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "time management", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cresource%20management%20skills%E2%80%9D).
			Management of Financial and Material Resources: Capacity for gathering resources to achieve tasks, including how money will be spent to get the work done, obtaining equipment, facilities, and materials, and accounting for expenditures. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "management of financial resources" and "management of material resources", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cresource%20management%20skills%E2%80%9D).
			Project Management: Capacityies to lead the work of a team to identify, select and implement the appropriate changes, tools, and improvements to achieve and deliver a defined goal. — **Source** edX, *Project Management Courses*, https://www.edx.org/learn/project-management#:~:text=What%20is%20Project%20Management%3F,project%20from%20start%20to%20finish.&text=Skills%20required%20for%20project%20management,time%20management%2C%20analytics%20and%20more.

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			Customer Experience: Capacity to manage positive interactions between an organization and its customers. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "manage customer experience", https://ec.europa.eu/esco/portal/skill; O*Net Resource Center, *The O*NET® Content Model*, "customer and personal services", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Ccustomer%20and%20personal%20service%E2%80%9D).
	Innovation and Creativity: Thinking of novel ideas, improvements and solutions by combining ideas or information and making connections between different fields and perspectives. Source: Consultations with the Global Future Council on the New Education and Skills Agenda; Kaufman, S. and J. Kaufman, "Creativity", *Character Lab*, https://characterlab.org/playbooks/creativity/.	**Problem-Solving**: Capacity to determine the source of a problem and find an effective solution. — **Source** indeed, *Indeed Career Guide: Problem-Solving Skills: Definitions and Examples*, 20 November 2020, https://www.indeed.com/career-advice/resumes-cover-letters/problem-solving-skills#:~:text=When%20employers%20talk%20about%20problem,situations%20and%20calmly%20identify%20solutions.	**Analytical Thinking**: Capacity to break down concepts and complex ideas into basic or fundamental principles. — **Source** Tenno, H., "The Difference between Analytical Thinking and System Thinking", *Medium*, 2 August, 2020.
			Creative Thinking: Capacity to bring a new idea or concept into existence through imagination and to imagine something that does not exist. — **Source** The LEGO Foundation, *What We Mean by: Creativity*, 2020; and Reeves, M. and J. Fuller, "We Need Imagination Now More Than Ever", *Harvard Business Review*, 10 April 2020.
			Critical Thinking: Capacity to analyse and interpret facts and information to make sound judgements. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "critical thinking", https://www.onetcenter.org/content.html#cm1%20(see%20%E2%80%9Ccritical%20thinking%E2%80%9D).
			Systems Thinking: Capacity to understand how concepts work together, what is the bigger whole of which something is a part, and how to identify patterns over time. — **Source** Tenno, H., "The Difference between Analytical Thinking and System Thinking", *Medium*, 2 August, 2020.

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			Computational Thinking: Looking at real-world scenarios and creating models that can be processed by a computer. — **Source** Industry and learning provider consultations
			Computer Hardware and Networking: Setting up a connected network of computing devices, such as laptops, desktops, servers, smartphones, tablets, and IoT devices that communicate with one another. — **Source** Industry and learning provider consultations
			Cybersecurity and Application Security: Using technologies, processes, and practices to protect computers, networks, programs and data from unauthorized access or attacks that are aimed for exploitation. — **Source** Industry and learning provider consultations
			Data Science and Analysis: Organizing and systematically analysing structured or unstructured data to create insights. — **Source** Industry and learning provider consultations
			Mobile Development: Developing applications for mobile devices. — **Source** Industry and learning provider consultations
			Human-Technology Interaction: Designing computer technology focused on the interfaces between humans and computers. — **Source** Industry and learning provider consultations
			Web Development: Building and maintaining websites. — **Source** Industry and learning provider consultations

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			Collaboration and Productivity Software: Using software designed to help get work done faster and more efficiently. — **Source** Industry and learning provider consultations
			Machining and Manufacturing Technologies: Using technologies that assist in industrial production and manufacturing processes. — **Source** Industry and learning provider consultations
			Cloud Computing: Delivering computing services over the internet. — **Source** Industry and learning provider consultations
			Customer Relationship Management Software: Using technologies to manage client relationships. — **Source** Industry and learning provider consultations
			Scientific Computing: Using computers to effectively solve scientific problems. — **Source** Industry and learning provider consultations
			Digital Marketing: Using the internet, mobile devices, social media, search engines and other online channels to reach consumers. — **Source** Industry and learning provider consultations
			Software & Programming Languages: Using software and programming languages. — **Source** Industry and learning provider consultations

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Skills and Knowledge: Skills are the capabilities needed to complete a task, and therefore a job. Knowledge is the body of facts, principles and theories that are related to a field of work or study, and that can be further split into dependent knowledge (practical and procedural) and context-independent or theoretical knowledge.	**Languages**: Communicating through reading, writing, speaking and listening in a mother tongue and/or in a foreign language. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/ Competencies, "languages", https://ec.europa.eu/ esco/portal/skill.	**Multi-lingualism**: Capacity to communicate through reading, writing, speaking and listening in a mother tongue and/or in a foreign language. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "languages", https://ec.europa.eu/esco/portal/skill.	**Indo-European**: Family of languages spoken in most of Europe, areas of European settlement and much of Southwest and South Asia. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Cowgill, W. and J. Jasanoff, "Indo-European Languages", *Encyclopedia Brittanica*, 13 March 2020.
			Sino-Tibetan: Family of languages that includes Chinese and Tibeto-Burman languages. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Egerod, S., "Sino-Tibetan Languages", *Encyclopedia Brittanica*, 2 November 2018.
			Afro-Asiatic: Family of languages spoken in the northern part of Africa, the Arabian Peninsula and some islands and adjacent areas in Western Asia. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Wolff, H., "Afro-Asiatic Languages", *Encyclopedia Brittanica*, 14 May 2018.
			Austronesian: Family of languages spoken in most of the Indonesian archipelago; all of the Philippines, Madagascar and the island groups of the Central and South Pacific (except for Australia and much of New Guinea); much of Malaysia; and scattered areas of Viet Nam, Cambodia, Laos, and Taiwan, China. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Blust, R., "Austronesian Languages", *Encyclopedia Brittanica*, 30 July 2018.
			Japonic: Family of languages spoken in the main islands of Japan. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020.
			Niger-Congo: Family of languages spoken by 85% of the population in Africa. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Bendor-Samuel, J., "Niger-Congo Languages", *Encyclopedia Brittanica*, 10 October 2018.

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Skills and Knowledge: Skills are the capabilities needed to complete a task, and therefore a job. Knowledge is the body of facts, principles and theories that are related to a field of work or study, and that can be further split into dependent knowledge (practical and procedural) and context-independent or theoretical knowledge.	**Languages**: Communicating through reading, writing, speaking and listening in a mother tongue and/or in a foreign language. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "languages", https://ec.europa.eu/esco/portal/skill.	**Multi-lingualism**: Capacity to communicate through reading, writing, speaking and listening in a mother tongue and/or in a foreign language. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "languages", https://ec.europa.eu/esco/portal/skill.	**Dravidian**: Family of languages spoken predominantly in South India and Sri Lanka — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Krishnamurti, B., "Dravidian Languages", *Encyclopedia Brittanica*, 11 August 2020.
			Turkic: Family of languages spoken in Eastern Europe and Central and North Asia. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Johanson, L., "Turkic Languages", *Encyclopedia Brittanica*, 11 August 2020.
			Koreanic: Family of languages spoken in the Korean Peninsula. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Asia Society for Global Education, *Korean Language*, https://asiasociety.org/education/korean-language#:~:text=Korean%2C%20known%20in%20the%20language,Korean%20Peninsula%20in%20northeast%20Asia.&text=Korean%20is%20also%20spoken%20by,in%20provinces%20bordering%20North%20Korea.
			Kra-Dai: Family of languages spoken in mainland South-East Asia. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020.
			Uralic: Family of languages spoken throughout north-eastern Europe, northern Asia and North America. — **Source** Gosh, I., "Ranked: The 100 Most Spoken Languages Around the World", *Visual Capitalist*, 15 February, 2020; Harms, R., "Uralic Languages", *Encyclopedia Brittanica*, 11 July 2016.
	Industry-Specialized: Specialized industry skills are specific to the field of the professions in question, such as Documentation, in Cloud Computing; Video and Editing, in Marketing, Sales and Content; or Radiation Oncology, in the Care Economy professional cluster. The cluster excludes skills related to the operation and design of digital technologies. — **Source** World Economic Forum, *The Future of Jobs Report 2020*, 2020. Refers to the "Specialized" skills cluster defined by Burning Glass Technologies and reflects conversations with data providers about the distinctiveness of some skills to particular industries.		

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Attitudes: Consistent behaviours, emotional intelligence traits and beliefs that individuals exhibit that influence their interpersonal interactions and their approach to ideas, persons and situations. Attitudes are learned and often a big part of the driving force of learning and the approach to doing tasks.	**Working with People**: Behaviours and emotional intelligence that enable individuals to complete tasks and jobs in a pleasant, cooperative way that is sensitive to others. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "interpersonal orientation", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cresource%20management%20skills%E2%80%9D).	**Active Listening, Communication and Information Exchange**: Paying attention to what others say and understanding points being made, establishing rapport, adjusting the register, and respecting the intervention of others. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "listen actively", https://ec.europa.eu/esco/portal/skill.	**Asking Questions**: Listening carefully to what other people say and asking appropriate questions to gain better understanding. — **Source** "Asking Questions", *Improving Communication Skills*, Coursera, https://www.coursera.org/lecture/wharton-communication-skills/asking-questions-6V5ks.
			Teaching and Training: Facilitating the acquisition of new knowledge and skills. Leading and guiding individuals and groups through a process in which they are taught the necessary skills and knowledge for life, future learning or for a particular job or set of jobs. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "teaching and training", https://ec.europa.eu/esco/portal/skill.
			Receiving Feedback: Reacting to valid and well-reasoned opinions and directions about one's work in a positive manner. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "gather feedback from employes", https://ec.europa.eu/esco/portal/skill.
		Service Orientation: Actively looking for ways to help others as well as to make them feel attended to and welcome. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "service orientation", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cservice%20orientation%E2%80%9D).	**Following Instructions and Procedures**: Following instructions given verbally or in writing and following standard or agreed procedures. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Assisting and Supporting Co-workers: Assisting and supporting colleagues, managers, volunteers and other co-workers in the performance of their tasks or in the operations of a business unit. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.

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			Persuasion and Negotiation: Persuading others to change their minds or behaviour as well as bringing them together and trying to reconcile differences. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "persuasion" and "negotiation", https://www.onetcenter.org/content.html#cm2%20(see%20%22persuasion%22%20and%20%22negotiation%22).
			Liaising and Networking: Developing alliances, contacts or partnerships, and exchanging information with others. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Demonstrating Consideration: Acting in an understanding and supportive manner that is sensitive to others' needs and feelings. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Ethical Leadership: Carrying out workplace activities according to accepted principles of right and wrong, including fairness, transparency and impartiality in work practices and conduct towards other people. — **Source** Industry and learning provider consultations.
			Building Trust: Creating a culture that enables team members to rely on each other. — **Source** Industry and learning provider consultations.

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			Time Management and Prioritization: Organizing one's own time to be able to deliver on commitments and responsibilities. — **Source** O*Net Resource Center, *The O*NET® Content Model*, "organizing, planning and prioritizing work", https://www.onetcenter.org/content.html#cm2%20(see%20organizing,%20planning%20and%20prioritizing%20work).
		Self-Awareness: Seeing one's own values, passions, aspirations, fit with environment, reactions (including thoughts, feelings, behaviours, strengths and weaknesses), and impact on others, as well as understanding how one is perceived by others, in terms of those same factors. — **Source** Eurich, T., "What Self-Awareness Really Is (and How to Cultivate It)", *Harvard Business Review*, 4 January 2018.	**Internal Self-Awareness**: Understanding one's own values, passions, aspirations and reactions. — **Source** Eurich, T., "What Self-Awareness Really Is (and How to Cultivate It)", *Harvard Business Review*, 4 January 2018.
			External Self-Awareness: Awareness of how one is perceived by others. — **Source** Eurich, T., "What Self-Awareness Really Is (and How to Cultivate It)", *Harvard Business Review*, 4 January 2018.
			Self-Control: Doing what's best despite short-term temptations; strength of will. — **Source** Kaufman, S. and J. Kaufman, "Self-Control", *Character Lab*, https://characterlab.org/playbooks/creativity/.

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			Adaptation to Change: Altering one's attitude or behaviour to accommodate modifications in the workplace. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Willingness to Learn: Showing a positive attitude towards new and challenging demands that can only be met via lifelong learning. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
		Attention to Detail, Trustworthiness: Dependability, commitment to doing the job correctly and carefully, being trustworthy and accountable, and paying attention to details. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, "attention to detail", https://ec.europa.eu/esco/portal/skill; O*Net Resource Center, *The O*NET® Content Model*, "attention to detail", https://www.onetcenter.org/content.html#cm2%20(see%20%E2%80%9Cactive%20learning%E2%80%9D).	**Meeting Commitments and Deadlines**: Performing one's tasks in a self-disciplined, reliable and goal-oriented manner, and ensuring that operative processes are finished at a previously agreed time. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Assuming Responsibility: Accepting responsibility and accountability for one's own professional decisions and actions, or those delegated to others. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Managing Quality: Pursuing excellence in workplace processes, products and activities. — **Source** European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.

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			Stress Management: Dealing with and managing highly stressful situations in the workplace by following adequate procedures, communicating in a quiet and effective manner, and remaining level-headed when taking decisions. — **Source** Industry and learning provider consultations; European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
			Persistence: Sticking to one's tasks in spite of fatigue or frustration. Source: European Commission, *ESCO (European Skills/ Competencies, Qualifiations and Occupations)*, Skills/Competencies, https://ec.europa.eu/esco/portal/skill.
	Global Citizenship and Civic Responsibility: Playing an active role in the global and local community and the application of civic values. — **Source** World Economic Forum, *Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution*, 2020.		**Social Justice**: Taking a conscious and active approach to building inclusivity and fairness across wealth, privilege and opportunity, and addressing biases in one's community, workplace, etc. — **Source** Industry and expert consultations.
			Social Cultural Awareness: Respecting and valuing others. Awareness of the wider world, of history and of social justice issues. — **Source** Industry and expert consultations.
			Technology Awareness: Being mindful of how technology is impacting societies, and understanding the responsible use of technology. — **Source** Industry and expert consultations; DQ Institute, *What is the DQ Framework? Global Standards for Digital Literacy, Skills, and Readiness*, https://www.dqinstitute.org/dq-framework/.
			Environmental Awareness: Being mindful of the impact of humans and human activitiy on the planet. — **Source** Industry and expert consultations.

Level 1 Definitions	Level 2 Definitions	Level 3 Definitions
Abilities: The range of physical, psychomotor, cognitive and sensory abilities to perform a job role.	**Physical* (includes Psychomotor)**: Abilities that influence strength, endurance, flexibility, balance and coordination (plus abilities that influence the capacity to manipulate and control objects). — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.	**Manual Dexterity, Endurance and Precision**: Abilities related to the capacity to manipulate and control objects, strength, endurance, flexibility, balance and coordination. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.
	Cognitive: Abilities that influence the acquisition and application of knowledge in problem-solving. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.	**Memory, Verbal, Auditory and Spatial Abilities**: Abilities that influence the acquisition and application of knowledge in problem-solving. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.
		Reading, Writing, Math and Active Listening: Core literacies needed to work with and acquire more specific skills in a variety of different domains. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.
	Sensory: Abilities that influence visual, auditory and speech perception. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.	**Visual, Auditory and Speech Abilities**: Abilities that influence visual, auditory and speech perception. — **Source** O*Net Resource Center, *The O*NET® Content Model*, https://www.onetcenter.org/content.html#cm2.

Notes

1. Hunter and Hunter, 1984.

2. Ibid.

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