YouthForesight

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Microcredentials for youth and work

International Labour Organization

unicef for every child

GENERATION UNLIMITED

DECENT JOBS FOR YOUTH

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Foreword

As the world of work continues to rapidly evolve, lifelong learning is increasingly becoming essential. Rapid technological change and the transition to sustainable economies makes it imperative to acquire new skills to facilitate transitions into and within the labour market, especially for young people. Furthermore, employers are also challenged in identifying a new workforce who possesses those skills or ensuring their existing workforce can be upskilled or reskilled accordingly. In this context, the traditional education system can be complemented with alternative learning opportunities including short courses that lead to microcredentials, which can meet the needs and aspirations of jobseekers and organizations to certify the acquisition of those skills.

In a global context of heightened labour market inequalities affecting workers and jobseekers across the globe, particularly young people, the International Labour Organization, UNICEF, the Global Initiative on Decent Jobs for Youth, and Generation Unlimited recognize the importance of promoting solutions that support the transition of young people into employment. These solutions include the development and recognition of labour market relevant skills to facilitate effective transitions into decent work, especially for young people who are disadvantaged, such as young women facing gender barriers, young refugees and young migrant workers, young persons with disabilities, and others.

Relevant and quality microcredentials have the potential to contribute to agile skills development, upskilling, or reskilling, and bring innovation to the recognition of non-formal learning in response to changing labour market demands. Moreover, if well designed, microcredentials could help address information asymmetries and offer employers insight on an individual's skills and competencies. Being typically short, flexible and usually focused on specific in-demand competencies, microcredentials could be beneficial for those facing geographic, financial, time, or other constraints that may limit their access to educational institutions.

This report examines the value of alternative learning opportunities that lead to microcredentials, with a focus on youth, as a flexible and cost-effective way of acquiring skills and validating competencies to enhance signalling mechanisms among jobseekers and workers. It also provides an analysis of the current debate on microcredentials globally, including their benefits, challenges, and potential impact on the labour market. Based on four illustrative cases from around the world, the report shows the usage of microcredentials by a sample of governments, companies, international organizations, and non-profit organizations, and sheds light on good practices in developing and deploying microcredentials. We hope this report will serve as a valuable resource for policymakers and other stakeholders that consider introducing microcredentials in their skills development toolkit.

We would like to express our appreciation to the authors of this report for their excellent work, as well as to all those who contributed their time and expertise to this important research. We look forward to continuing our efforts to promote lifelong learning and skills development that promote employment and just and inclusive labour markets.

Sincerely,

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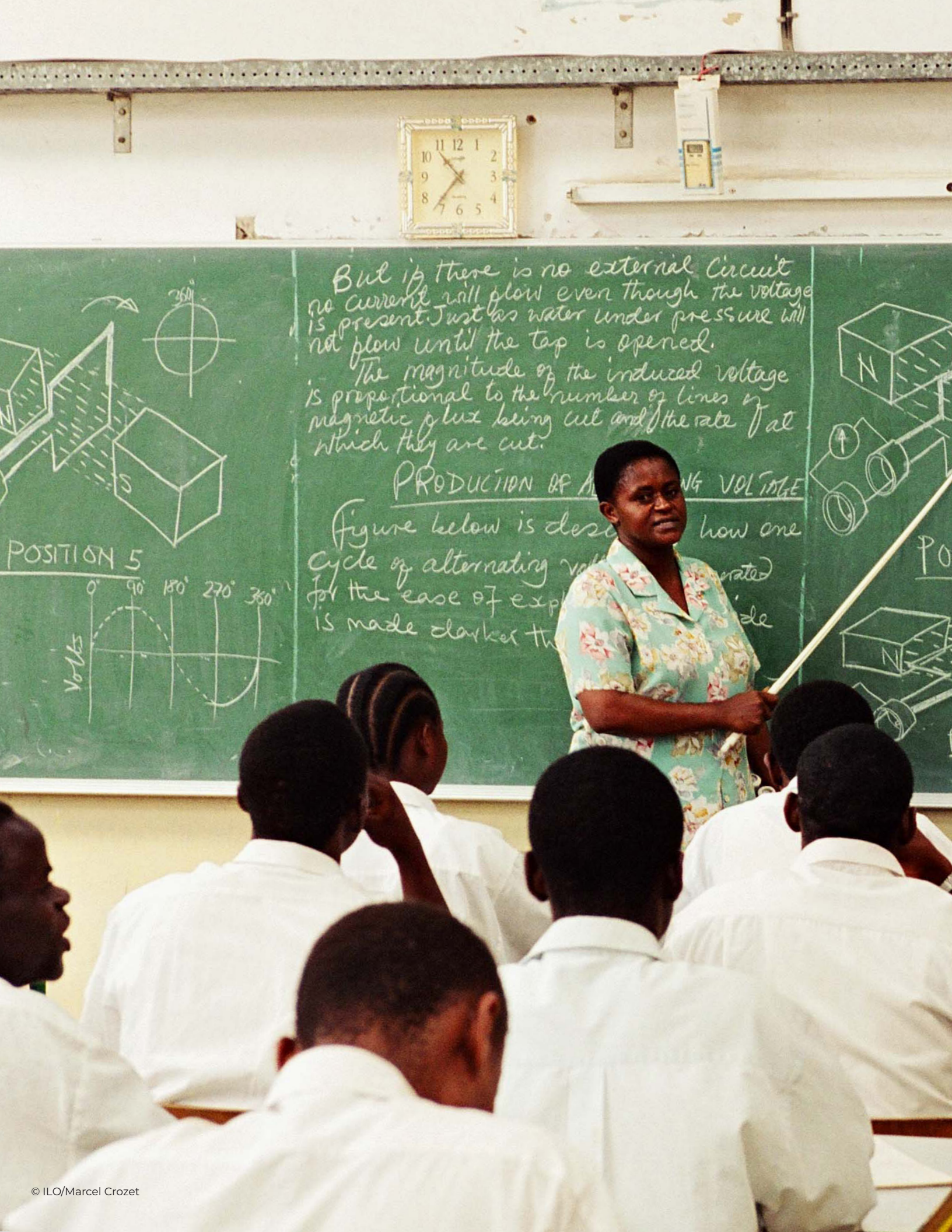

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The team responsible for preparing the draft report was led by James Keevy of JET Education Services, with contributions from Kelly Shiohira, Carla Pereira, Lungelo Mthembu-Slater, Patrick Molokwane, Zaahedah Vally, and Wamweni Shamambo. The JET Education Services team conducted extensive desk research and interviews with key informants across regions, demonstrating meticulous work, dedication, and perseverance. The first two case studies showcased in the report were drafted by Carla Pereira, while Kelly Shiohira drafted case studies three and four. Maureen Mosselon provided editorial support.

The study was coordinated by Marcelo Cuautle Segovia with the support of Lena Xinyu Yan, both from the ILO's Employment Labour Markets and Youth Branch. Pedro Moreno da Fonseca and Susana Puerto González, from the ILO, substantially reviewed and edited the last manuscript. Technical review and guidance were provided by Marcelo Cuautle Segovia, Takaaki Kizu (ILO) and Pedro Moreno da Fonseca (ILO), as well as Bassem Nasir (UNICEF), Rachel Cooper (UNICEF), Sena Lee (GenU), Mami Kyo (GenU) and Julia Sellers (UNICEF Consultant). Paul Comyn (SmithComyn & Associates) provided technical advice in the scoping stages of the report. Susana Puerto González (ILO and Decent Jobs for Youth) and Urmila Sarkar (GenU) guided the selection of the research topic, while Thomas Myhren, Peter Matz, Iris May Ellen Caluag, Julie Needler, and Wesley Furrow (all GenU) offered support throughout various stages of the research.

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Table of contents

Figures and Tables

Abbreviations

ACQF	African Continental Qualifications Framework
AI	Artificial intelligence
AWS	Amazon Web Services
CEDEFOP	European Centre for the Development of Vocational Training
COL	Commonwealth of Learning
CMF	Common Microcredential Framework
ECIU	European Consortium of Innovative Universities
ECTS	European Credit Transfer and Accumulation System
ESCO	European Skills, Competences, and Occupations
ETF	European Training Foundation
GDN	Groningen Declaration Network
HEI	Higher education institution
ICDE	International Council for Open and Distance Education
ICT	Information and communication technologies
IITE	UNESCO Institute for Information Technologies in Education
ILO	International Labour Organization
ISCED	International Standard Classification of Educational Qualifications
ISCO	International Standard Classification of Occupations
IT	Information technology
ITESM	Instituto Tecnológico y de Estudios Superiores de Monterrey
LMIC	Low- and middle-income country
MICROBOL	Microcredentials linked to the Bologna Key Commitments
MOOC	Massive open online course
NFT	Non-fungible token
NLQF	Nederlands Kwalificatieraamwerk
NSDC	National Skill Development Corporation (India)
NCVET	National Council for Vocational Education and Training
NSQF	National Skills Qualification Framework
O*NET	Occupational Information Network
OECD	Organisation for Economic Co-operation and Development
RPL	Recognition of prior learning
SDG	Sustainable Development Goal
SPOC	Small private online course
STT	Short-term training
TVET	Technical and vocational education and training
UNICEF	United Nations International Children's Emergency Fund
UNESCO	United Nations Children's Fund
UNEVOC	UNESCO International Centre for Technical and Vocational Education and Training
VC	Verifiable credential
WBL	Work-based learning
WHO	World Health Organization
YOMA	Youth Opportunity Marketplace

Executive summary

Why this research?

The study explores the opportunities and limitations posed by microcredentials in enabling transitions into and within the labour market, considering **in particular the situation of young people.** In reviewing existing characterizations, the study proposes a working definition of microcredentials, draws on the latest evidence on credentials and skills recognition, and leverages experiences from four illustrative cases in low- and middle-income countries (LMICs). The illustrative cases covered the use of microcredentials in India as well as the application of microcredentials in the health sector, in a corporate environment, and in a job matching platform.

Study methodology

The study relied on a literature review and analysis of microcredentials, alongside the information and evidence emerging from four cases depicting the use of microcredentials. Four research questions underpinned the study: (i) How are microcredentials defined by different sources, and what features do different sources attribute to microcredentials?; (ii) What are the commonalities, and what are the debates?; (iii) Are there different types of microcredentials, and how should they be defined?; and (iv) What are the challenges and opportunities associated with microcredentials?

Key definitions[1]

A ***credential*** is the representation of recognized and verified learning achievements, independent of the context and way in which the corresponding knowledge, skills and attitudes were developed. *Credentials* are increasingly assuming a digital form and when framed by a self-sovereignty approach, they allow users to autonomously exert authority over the relevant data, easily accessing it, and utilizing it in relevant, exchangeable formats.

A ***microcredential*** is a building block of a credential. It can be stacked into wider credentials and is most often associated with the completion of a short training programme. It could reflect non-formal and informal learning experiences.

Main findings

Microcredentials may disrupt today's learning and training systems

Leveraging some features from massive open online courses (MOOCs) and small private online courses (SPOCs), microcredentials have emerged as mechanisms to recognize the completion of short learning activities delivered in formal, non-formal or informal learning contexts. They can also codify abilities in a fine-grained manner that is particularly compatible with digital processes. During and after the COVID-19 pandemic, the international community has expressed further interest in microcredentials due to the disruption of traditional and formal learning modalities. In the post-pandemic environment, however, pedagogical questions are emerging on how microcredentials shape approaches to learning and training, and whether and how they facilitate more equitable forms and structures for education, training, and employment.

1 This is a working definition solely presented for the purpose of this report, and does not represent the views of the International Labour Organization (ILO) nor UNICEF.

Microcredentials' focus on learning outcomes enables the recognition of skills and competences

Over the past two decades, learning outcomes have been comprehensively studied and integrated across qualifications and partial qualifications in the schooling, higher education and technical and vocational education and training (TVET) sectors. They are the basis for microcredentials, strengthening their ability to recognize skills and competences and connecting them to registered (partial) qualifications. Some microcredentials feature innovative assessments methods which enhance the verification of learning achievements. Moreover, microcredentials have emerged as a faster response to fill the skills and competences demanded by new jobs, as compared to the more conventional qualifications processes.

Ongoing reforms of qualification systems and frameworks enable the integration of microcredentials into education and training systems, which in turn can facilitate further reforms

Existing qualifications frameworks can gain considerably by becoming more digital and more agile. Credit systems developed a few decades ago can be transformed into formats that allow for stacking and more automated forms of exchange and combination of credentials. Smaller-sized partial qualifications can also be managed in a simpler manner. Critically, national skills qualification frameworks (NSQFs) can further evolve into frameworks that accommodate different types of learning, enhancing signalling of skills and integrating new forms of evidence and verification of learning achievements, with adherence to data privacy laws.

Microcredentials are a means towards improved skills development and verification of learning, not an end in themselves

Microcredentials allow for flexibility in the acknowledgement of learning achievements, potentially reflecting industry practices and the changing nature of skills demanded in the labour market more accurately. They exert a transforming force over the provision of training and verification of learning; nevertheless, they do not constitute an end in themselves. Microcredentials need to be relevant to the labour demand and do not do away with pedagogical concerns, nor the need to ensure the overall quality of training.

Untapping the potential of microcredentials requires career development support to individuals and an enabling environment based on adequate regulations and incentives

Today, microcredentials are mainly used by adults in employment, as continuing TVET and supplements to full qualifications. While microcredentials are appealing to many learners, especially young people who view them as a tool to enhance job creation, job security and lateral movement, they may not always translate into strong career outcomes. This is because not all microcredentials hold value for employers, provide steppingstones to official certificates or qualifications, or have a strong signalling function in the labour market. The trust microcredentials enjoy is variable, and so is their value in different sectors and occupations. To harness the full potential of microcredentials, individuals must be informed about their currency and value in the labour market, their level of quality, their status regarding qualification systems, and generally be supported in accessing and combining existing microcredentials. Microcredentials also need to be embedded in an adequate regulatory environment with suitable digital resources.

Digitalization and new technologies are contributing to an evolution of terminology and learning concepts that can be synthesised in six transitions in learning recognition

- From understanding human abilities in terms of knowledge, skills and competencies to including traits with distinguishing characteristics such as professional status.
- From understanding types of learning in terms of formal, non-formal and informal categories to including the increasingly seamless interrelationships between the recognition of formal, non-formal and informal lifelong learning made possible through a user-centric approach, digital forms of recognition, improved data interoperability, and closer alignment between learning and the world of work.
- From paper-based certificates (now being phased out) to the recognition of digital certificates and digital identity made possible through the introduction of new technologies, including blockchain.

- From centuries-old qualifications that denote formal learning achievements to recognizing a credential as the sovereign digital representation of achieved, attributed, portable and verified skills and traits.

- From quality assurance used as an external measure of verification of learning achievement for formal learning to verification that can take place across three levels: self-verification;[2] peer-verification; and independent verification.

- **From CVs that are only partly verifiable** to representations based on digital identities synchronized across supply- and demand-side sources.

States and regional blocs are preparing themselves for the advancement of microcredentials with the support of international organizations

Microcredentials have permeated education and skills development systems in Canada (Ontario province); Ireland (through the Irish Universities Association initiative);[3] India (through the eSkill India digital learning initiative); and the Philippines (through the Alternative Learning System administered by the Department of Education) among others. Several international bodies recognize the important role that microcredentials play in lifelong learning, reskilling and upskilling in an uncertain future of work. The growing attention from the international community has accelerated in the last two years, with research being developed by organizations such as the European Centre for the Development of Vocational Training (CEDEFOP), the Organisation for Economic Co-operation and Development (OECD), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and UNICEF.

Despite the growing interest on microcredentials, there is still limited evidence about their labour market impacts, particularly among youth

Microcredentials are fostering innovations on the way skills and competencies are delivered, assessed and recognized. Technology enabled components have made them appealing to young people and to governments and organizations leveraging tech solutions in integrated delivery systems. Despite the vogue, there is still limited empirical evidence on the impacts of microcredentials on labour market outcomes of individual users. More research is needed to map out the transmission channels, success factors and final effects on employment and earnings of people, including youth.

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2 Self-verification corresponds to cases in which users take the responsibility to autonomously obtain a certificate to verify the credential on request by a third party (e.g., a hiring company).

3 The Irish Universities Association initiative aimed to develop a national multicampus microcredential system over five years. See more at IUA, 2020.

Recommendations and conclusions

Recommendation 1:
Enable reforms of qualification systems and frameworks to progressively accommodate quality microcredentials

Well-designed microcredentials reflect both industry practices and standards as well as the learning outcomes that should inform qualifications. Linking microcredentials to qualification systems will enable them to be stacked and combined, providing flexible pathways into partial and full qualifications. Examples of such microcredentials include modularised courses in higher education and TVET, whose granularity helps to recognize and validate skills and competencies in a flexible way, supplementing and/or replacing more traditional forms of credentialing.

Recommendation 2:
Provide quality assurance for microcredentials and raise awareness about their value

Microcredentials can advance learning and ensure access to skills and qualifications if relevant agents have trust in them. Quality assurance systems and awareness-raising campaigns should inform enterprises and individuals about the potential and value of microcredentials in upskilling and re-skilling processes. As in the case of TVET or apprenticeships systems, it is important for this process to reflect the collaboration between governments, training providers, and employers' and workers' organizations.

Recommendation 3:
Develop normative standards for microcredentials

The integration of quality assurance calls for standards that at national, regional, or international level recognize and balance the needs of the labour supply and demand, build on the characteristics and regulations of skills development and training systems, and leverage the experience and voices of governments, employers' and workers' organizations, civil society, and young people.

Recommendation 4:
Provide career development services and support to improve microcredentials' uptake

Individuals of all ages require support in integrating microcredentials in personal career strategies. The availability of career development services and awareness of career practitioners about microcredentials is therefore key to their uptake, securing a clear understanding about their benefits. Career development services can go a long way in ensuring the identification of career paths, clarity on the skills and competences demanded by the labour market, the acquisition of both technical and core skills, and additional supporting strategies to facilitate the transition to jobs. Financial support may be also key to facilitate access to microcredentials, especially among those most vulnerable in the labour market such as women and youth.

Recommendation 5:
Develop an enabling digital ecosystem for microcredentials reliant on an ethical framework

Interoperable platforms that link individual career development processes, certification systems and individual incentives, facilitate the role that microcredentials can play in fostering access to quality, demand-driven skills and qualifications. These platforms allow for ownership and efficient recognition and exchange of information regarding skills, which in turn helps with hiring processes, staff development, and planning. Investing in such platforms, their ethical frameworks, and the technologies that enable the development, delivery, validation, and safe storage of microcredentials is strategic yet costly and complex. It is important to leverage the lessons learned from countries and regional blocs where such platforms have been developed and explore innovative tech-based solutions, such as blockchain, ensuring a secure and ethical treatment of data.

Recommendation 6:
Develop new forms of governance for credentialling platforms

The growing development of credentialling platforms invites a review of the governance and oversight of credentials at national level. While some governments are testing decentralized and more autonomous governance models, these developments are isolated and take place mostly in developed countries. Further consideration must be given to participatory, ethical and self-sovereign approaches built on the identity of citizens, including youth.

Recommendation 7:
More empirical evidence on the impact of microcredentials on labour market outcomes will create positive feedback loops in their design and implementation

As the use of microcredentials expands, it is important to integrate metrics of success to trace their impact on intended outcomes, from the quality of skills recognition mechanisms to the transition of users into employment and decent work.

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Section 1
— Introduction

Overview

Microcredentials have emerged as mechanisms to recognize the completion of short learning activities (OECD 2021a; ETF 2022). They have been the subject of growing attention, especially due to the disruptions in education and training caused by the COVID-19 pandemic, which also hampered the recognition and assessment of skills and competences and the resulting transition of jobseekers into employment. Some recent studies of microcredentials include ETF 2022; UNICEF 2019, 2021a; ILO 2021a; UNESCO 2021a; Goger et al. 2022; Broadband Commission for Sustainable Development et al. 2020; and CEDEFOP 2022a.

This study builds on the existing literature, takes stock of definitions, practices, and experiences of microcredentials, and examines the potential role and limitations of microcredentials in facilitating transitions into employment.

Building on the work of Wheelahan and Moodie 2021; Brown and Mhichíl 2022; Brown et al. 2021a; and Young et al. 2019, the study kick-started with the following framing questions: Is "microcredential" a new term (Ralston 2021, CEDEFOP 2022a) or an existing learning modality with a new title? Can microcredentials disrupt today's learning and training systems?

While the jury is still out, it is clear that microcredentials are gaining traction. They are part of the signalling game, where individuals own and communicate their skill set to employers while employers verify the accuracy, quality and compliance of such skill set. They are increasingly delivered by industries, possibly hinting at a lack of trust in the ability and speed of education and training systems to equip individuals with demand-driven skills and competences. Additionally, governments, employers, and workers recognize the value of lifelong learning to ensure the relevance of skills, especially in a context of ever more frequent labour market transitions.

These issues have gained renewed relevance in the ongoing discussion around the "fourth generation" of qualification frameworks (ACQF 2021), mutual recognition systems, the future of work (ILO 2021a), and the future of education (UNESCO 2021a; UNESCO-IITE 2022). The impact of digital technologies, accompanied by a wider coverage of information and communication technology (ICT) infrastructure, are making education and training systems much more flexible, diverse, and targeted at granular skilling needs (Sellers et al. 2021), which connects neatly with the development of digital ecosystems for microcrednetials.

This study explored the extent to which perspectives and expectations of microcredentials held by employers, young people, and labour market institutions (including employment services) are consistent with offerings by education and training providers. It also identified potential challenges and opportunities associated with microcredentials, with regional and country-level examples, particularly in low- and middle-income contexts. The research was largely explorative, providing a wide overview to position microcredentials in the education and training landscape.

Approach and methodology

The overall goal of this research was to i) determine whether and how microcredentials are or can be a contributor to decent work, with a focus on youth; and ii) address the potential challenges and opportunities associated with microcredentials, particularly in LMICs. Four research questions underpinned the study:

1. How are microcredentials defined by different sources, and what features do different sources attribute to microcredentials?
2. What are the commonalities, and what are the debates?
3. Are there different types of microcredentials, and how should they be defined?
4. What are the challenges and opportunities associated with microcredentials?

To achieve the goal, a review and analysis of current literature on microcredentials was complemented by information from four illustrative cases of microcredential application. A mapping of microcredential literature was developed to inform the selection of the illustrative cases, which were carefully chosen to respond to the research questions, while also keeping a focus on developments within LMICs at different levels. The mapping and selection process was facilitated by the researchers and the ILO and UNICEF teams. A key consideration was the strategic focus of the two agencies, as well as access to key informants and publicly available literature. Further consideration was given to known instances of microcredentials being offered. While the selection of the four illustrative cases considered the implementation of microcredentials as an important factor, it became evident during the research that they were still at a conceptual level or at an early stage of implementation.

Key informant interviews, focus groups, and the review of available public documents were carried out across the following cases:

- **A country case: India** provides an interesting example of a country that has integrated microcredentials in its formal education and skills development system while boosting its ability to embed technology solutions at scale, for instance in the Prime Minister's Skill India Programme, Pradhan Mantri Kaushal Vikas Yojana (PMKVY), the National Skills Qualifications Framework (NSQF), and DigiLocker.

- **A sector case:** The **health sector** has been leading microcredentialing internationally, awarding the most certificate programmes. A prime example is the extent to which vaccination certificates that confirm inoculation have leveraged the new technologies linked to digital credentialling.

- **A company case: Microsoft** provides an example of private sector-led microcredential offerings to learners, workers, and jobseekers in the public domain.

- **A project case:** Led by UNICEF, **the Yoma platform**[4] records the skills acquired by young beneficiaries in a digital identity credential wallet, which is based on blockchain technology. It offers an novel model of a microcredential tool implemented in various African countries, with direct access to users, based on latest technologies, and showcasing a self-sovereign identity (SSI) design.

This report has four main sections: The first section focuses on terminology. The second section explores the rise and evolution of microcredentials, noting the emerging interest and latest developments. The third section dives into the four illustrative cases and provides some comparative analyses. The concluding section contains lessons for the future of microcredentials and some policy recommendations.

4 More information on the Yoma platform is available at https://www.yoma.foundation/about. See also UNICEF 2021a, 2021b and 2021c.

Section 2
— Defining Microcredentials

Key points

Governments, through ministries of education and skills development authorities, are increasingly developing guidelines for the design and implementation of microcredentials. This trend is more pronounced in regional blocs, notably in the European Union and progressively in North America and Asia.

The varying definitions and synonyms for the term "microcredential" have created confusion and a lack of understanding amongst employers, learners, and jobseekers.

The definition adopted by this report starts by identifying a credential as the representation of recognized verified learning achievements, independently of the context and way in which the corresponding skills, knowledge and attitudes have been developed. In this regard, a microcredential is a building block of a credential and while it is most often associated with the completion of a short training programme, it can also reflect components of other traits, such as professional status, citizenship, or financial surety.

Introduction

The idea of "unbundling" education and training programmes into smaller parcels, functions, and courses has been present in the literature since the mid-Seventies, while the idea of offering short courses for reskilling emerged only in the early 2000s, particularly in the European context (Hudak and Camilleri 2021, 5). The term "microcredential" is used synonymously with short learning programmes and the modularization of degrees by higher education institutions (HEIs). As the notion of microcredentials continues to grow and evolve, HEIs are building on their short programme offerings to expand the student body, increase university recognition and experiment with new pedagogies and modes of delivery especially since these do not need to be regulated by the government (OECD 2021a). Microcredentials are even viewed as the:

> … dominant form of education in driving instruction, vendor-led IT certification, and in medical continuing professional development (Brown and Mhichíl 2020, 314). However, only recently has the idea of microcredentials, especially in TVET and higher education, become a primary topic of policy discussions and dialogues. In Europe, for example, in the context of the growth, sustainability, and resilience ambitions of the European Skills Agenda,[5] the European Digital Strategy,[6] and the *Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience* (Council of the European Union 2020), further research, seminars, and policy

5 The European Skills Agenda can be accessed at: https://ec.europa.eu/social/main.jsp?catId=1223.

6 The European Digital Strategy can be accessed at: https://digital-strategy.ec.europa.eu/en/policies.

dialogues have sparked the take-up, validation, and recognition of microcredentials. Similarly, in Canada, New Zealand, and the United States, the proliferation of microcredentials has stimulated substantial debate given the high market value it has for employers and learners alike.

It is, therefore, not surprising that microcredentials are being developed in multiple contexts with a variety of objectives, from fulfilling lifelong learning to broadening participation to all citizens. Microcredentials are being offered by universities, colleges, companies, professional bodies, and licensing organizations, and through partnerships between education and business. Microcredentials can be offered online, including the over 900 of them which are offered as MOOCs, and through various online platforms, most of which are based in the United States.[7]

Despite the prevalence of MOOCs, it is important to remember that not all microcredentials are delivered through digital platforms. According to CEDEFOP (2022b), the traditional face-to-face mode of delivery (classroom-based learning) is a commonly used approach also in the delivery of microcredentials. The same report argues that microcredentials are mainly used by adults in employment, as continuing TVET and supplements to full qualifications. Whether online or offline, microcredentials are offered by a range of providers including industry, the private sector, government, individual practitioners, international agencies and the formal education sector.

When it comes to microcredentials offered in the formal education sector, it must be noted that there is an extent to which the conversation is a new fleece on an old sheep. For example, formal post-compulsory courses are almost always structured in a flexible, stackable[8] way – e.g., a degree in literature can have a regional, era, language and/or subject specialization built up around an individual student's decisions on courses, simply within a broad framework of how many credits must be achieved and what broad categories of learning must be engaged. Post-graduate fellowships and certificates have always enabled additional credentialled learning outside of a qualification. "Non-degree programmes" or certificate programmes also share all the characteristics of microcredentials and accounted for 60 per cent of the over one million unique credentials offered in the United States in 2020 according to Credential Engine.[9] Even as early as 2010, 41 per cent of credentials awarded by community colleges[10] in the country were non-degree certificates (Xu and Trimble 2014).

Therefore, it is clear that the concept of smaller units of learning (that at times can aggregate to or augment a qualification) is hardly revolutionary, and some of the proliferation of microcredentials may merely amount to rebranding or reorienting traditional continuing education rather than fundamental shifts in delivery modes (OECD 2021a and 2021b). Where the potential of microcredentials really lies is in eliminating the institution-based limitations to this sort of flexibility. They enable the creation of a new learning ecosystem which involves not only traditional educational institutions but also entities such as employers and MOOC providers (Sood et al. 2020).

Outside of higher education, other organizations such as IBM and Google have developed learning opportunities for their employees and non-employees, linked to badges (Iafrate 2017) or online certificates. These are offered in partnership with Northeastern University in the case of IBM, and through Coursera in the case of Google (Oliver 2019). Several high-profile companies are now also offering new types of learning experiences that both challenge and complement the traditional university degree. For example, in June 2021 Google offered 1,000 free study scholarships for Dublin jobseekers delivered through Coursera (O'Dea 2021).

7 A comprehensive listing of MOOC-based microcredentials is maintained by Class Central.

8 Stackable credentials are defined as individual's achievements/certificates achieved over time that improve a learner's employability or skill set.

9 More information is available on the Credential Engine website, available at: https://credentialengine.org/.

10 Community colleges typically offer technical and vocational education and training, with certificate, diploma and degree programmes.

Google announced this as part of its "stated goal of disrupting established education models through its new Career Certificates", which it claims will be recognized as the equivalent of a full bachelor's degree for recruitment purposes (OECD 2021b as cited in Brown and Mhichíl 2020, 314). However, an extensive study of current MOOC-type courses found that there are major variations between courses where microcredentials are being awarded (Pickard 2018). The study highlighted that

> … [w]hile all employers understand that a master's degree signifies a higher level of preparation than a bachelor's degree, it is impossible to say whether a Udacity Nanodegree prepares a person more or better than an EdX Professional Certificate or a Coursera Specialization (sic).[11]

In sectors such as manufacturing, engineering, ICT, health, and law, that are already offering microcredentials (CEDEFOP 2022b), different microcredentials offered by various organizations are perceived by employers to have varying value depending on the quality of competency assessments and the range of competencies covered by the credential (see Young et al. 2019).

One example of a government-offered microcredential programme is the Prime Minister's Skill India Programme, *Pradhan Mantri Kaushal Vikas Yojana* (PMKVY), one of the flagship programmes of the Ministry of Skill Development and Entrepreneurship (MSDE) which is implemented by the National Skill Development Corporation (NSDC). PMKVY offers short-term (three to six months) training programmes mostly targeted at school/college dropouts or unemployed individuals. The short-term training programmes are aligned with the NSQF and provide students with soft and entrepreneurial skills as well as financial and digital literacy.[12] These short-term training programmes are a form of microcredentials and through a government platform called DigiLocker, students can store their credentials online in perpetuity and access them at any time or place.

In addition to technological advancements, structural reform of qualification frameworks can also enable the integration of microcredentials into education and training systems. This, in turn, canpave the way to further structural reforms.

11 More information on this can be accessed through the Class Central website at: https://www.classcentral.com/report/moocs-microcredentials -analysis-2018/.

12 For more information on the PMKVY, see their website at: https://www.pmkvyofficial.org/home-pag.

Reform processes, which are already under way in many countries, provide key insights for the integration of microcredentials in labour market institutions and other type of organizations. For example, stackable credential pathways and frameworks are a key mechanism for the integration of microcredentials, as they enable smaller units of learning to be compiled into larger qualifications. The establishment of credit banks further enables this aggregation and can make allowances for non-formal and informal as well as formal learning, often through processes such as the recognition of prior learning (RPL). Providers would then be called on to define levels of microcredentials according to the national or regional qualifications frameworks. Semantic interoperability, particularly the harmonization of educational standards between institutions and employers, is another prerequisite for the integration of microcredentials into education (Sood et al., 2020).

Towards a common definition of microcredentials

There is a growing sense that "skills, rather than occupations or qualifications, form the job currency of the future" (Deloitte Access Economics 2019, 19). According to the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) (as cited in Brown and Mhichíl 2020, 314; see also ITESM 2019):

> ... the 'sheepskin effect' of higher education, where its intrinsic worth has little to do with the time and effort that students devote to their studies but rather the parchment obtained at the end, is believed to be losing its employability value. Whether or not this is true, it is one of the reasons cited that HEIs need to develop a microcredential strategy.

There is much evidence from around the globe that an increasing number of HEIs are "rushing to follow early microcredentialing pioneers by repackaging their traditional offerings to prepare more work-ready graduates" (Brown and Mhichíl 2020, 314).

In a study about the meaning of microcredential, various stakeholders across Europe were interviewed, including students, educational institutions, governments, and employers. Most participants could not define the term (MicroHE Consortium 2019). Another group of interviews conducted by Resei et al. (2019) also found that employers and even universities (directors and strategy planners) were unfamiliar with the term, resulting in low awareness of the value associated with this new type of credential. It follows that "agreeing on what is meant by the term 'microcredential' is essential to establish standards, compare best practices, and ensure recognition and mobility for credential bearers and issuers" (Brown et al. 2021a, 233). The two main dimensions of credits and bundling are often used as a mechanism to explain different types of credentials, with microcredentials often viewed as credit-bearing, but unbundled. This lens is useful, but as will be discussed further in Section 4 of this report, it may be too limited in its approach as it assumes that microcredentials all have some form of credit value.

Definitions of microcredentials are linked to a wide range of skilling programmes, provided by a range of industry, academic and public sector actors. Of these, some of the best-researched include certificate programmes offered at post-secondary institutions and MOOCs. There have, however, been some recent concerted international efforts to develop a common definition for microcredentials. In 2021, UNESCO convened a global panel of 47 experts who agreed on the following definition:

A microcredential:

1. is a record of a focused learning achievement verifying what the learner knows, understands or can do;
2. includes an assessment based on clearly defined standards and is awarded by a trusted provider;
3. has stand-alone value and may also contribute to or complement other microcredentials or macrocredentials, including through recognition of prior learning; and
4. meets the standards required by relevant quality assurance.

Source: UNESCO 2021a.

The summary below[13] draws on the ten characteristics of microcredentials identified by the global expert panel. The purpose of this exercise has not been to repeat the emerging international consensus, but rather attempt to build on it, with a specific focus on the four research questions that form the basis for this study. It should be noted that the definitions below tend to focus on specific roles and functions that micro-credential can have, not necessarily providing a broad definition.

Certification:
Definitions stress how micro-credentials can be certificates issued by institutions such as higher education providers, vocational education and training institutes, industry certification bodies, noting that certification often implies public recognition and trust in the issuing body:

A microcredential is a record of a short learning programme or activity in a subject (small modules, units, or learning building blocks) that could be stacked into a larger credential or be included in a working portfolio (Chakroun and Keevy, 2018; MicroHE Consortium 2019; Cirlan and Loukkola 2020; Brown et al. 2021a; Henderikx et al. 2021; OECD 2021a). A microcredential is a credential of assessed learning issued by a trusted institution (Oliver 2019; European Commission 2020a).

Relation to other credentials and types of learning:
Some definitions emphasise the role of micro-credentials as part of formal learning processes by targeting a specific skillset or area of knowledge, as well as the role they play in acknowledging acquisition of skills and knowledge through non-formal and informal processes:

Microcredentials differ from traditional degrees, certificates, and qualifications in that they are offered over a shorter or flexible period, are specific to a subject, and have stand-alone value (MicroHE Consortium 2019; ECIU 2020; Kato et al. 2020; Stokkink et al. 2021; Proctor 2021.)[14] Over time, they can stand alone, or accumulate into or be complementary to a formal qualification, larger credential, or degree (Pickard 2018; ICDE 2019; Oliver 2019). They serve to recognize knowledge, skills, and/or competencies attained or exhibited by a person and may or may not be formal, modular, portable, digital, and universal (Chakroun and Keevy 2018; Grech 2018; MicroHE Consortium 2019). Credentials that are not recognized as stand-alone formal educational qualifications by relevant national education authorities (Kato et al. 2020).

Outcomes and assessment:
Some definitions speak directly to the potential of micro-credentials as a tool to target skills needs and reflect learning outcomes that can be part of formal skills assessment and recognition:

Microcredentials have a defined statement of purpose and learning outcomes and address the need(s) of an employer, industry, market, and/or community (New Zealand Qualifications Authority 2022; Malaysian Qualification Authority 2020; Henderikx et al. 2021). They are assessed based on clear and transparent standards (European Commission 2020a).

Standards and quality assurance:
Definitions can focus how micro-credentials are growingly being targeted by the development and expansion of quality assurance mechanisms linked to education, vocation training, qualification and credit systems. For example:

To ensure the quality assurance expected by microcredential stakeholders, microcredential assessment methods and criteria are weighed against institutional and national standards (New Zealand Qualifications Authority 2022).

13 The summary includes several direct quotes from the original texts. To improve readability each instance is not placed in quotes.

14 See the State University of New York (SUNY) website for more policy on their work with microcredentials at: https://system.suny.edu/academic-affairs/microcredentials/.

Purpose and types of skills covered:
Some definitions stress how micro-credentials are growingly understood as a way to respond to growing needs for specific skillsets, as well as their integrative role across different learning experiences:

Although microcredentials are often certified by traditional learning programmes, they also serve to recognize the skills and achievements of individuals acquired in other learning environments, such as the workplace or volunteer programmes (European Commission 2020a). They help facilitate lifelong learning by engaging people in learning activities that address personal, societal, cultural, and labour market needs (Unger and Zaussinger 2019; New Zealand Qualifications Authority 2022). The results are technical skills and in-demand soft skills that allow individuals to adapt quickly to the ever-changing labour market (Meghnagi and Tuccio 2022). In many cases, microcredentials are associated with just-in-time courses, filling gaps, and continuing professional development (CPD). Microcredentials are also often associated with digital and soft skills (Malaysian Qualification Autority 2020). Microcredentials are a form of micro-certification earned by proving competence in one specific skill at a time, via a portfolio of evidence, created through classroom practice (BloomBoard 2021).

Ownership, portability, shareability:
Some definitions emphasise how micro-credentials are increasingly supported by digital platforms and can be contextualised within a secure environment that promotes individual ownership of career information:

Microcredentials are shareable proofs of skills, knowledge, and competences gained. They are owned by the learner, are portable, quick to verify, and can easily be shared with employers or social networks through a variety of mediums, including digital platforms (Camilleri and Rampelt 2021; Van de Laar et al. 2022; Quigley 2021).

Providers of microcredentials:
Definitions can also emphasise the role of micro-credentials in provision of structured or semi-structured courses:

Microcredentials are designed, delivered, and certified by higher education institutions (HEIs), commercial establishments, professional bodies, private and community organizations, and traditional education and training providers (Rositer and Tynan 2019; e-Valuate consortium, 2019; European Commission 2020a). Programmes could also be provided on various platforms through collaborations between different organizations, such as businesses, non-profits, and HEIs (e.g., MOOCs, edX, Coursera, Udacity, FutureLearn, etc.).

Verifiability:
Definitions can also emphasise their role in verifying acquired skills and knowledge, frequently through an accredited institution:

Microcredentials can verify that an individual has achieved the learning outcomes of a short learning programme accredited by a trusted institution (European Commission 2020a; OECD 2021a and 2021b; Proctor 2021). Verification can be in the form of an online or printed certificate that states the name of the learner, the issuing authority, the assessment method and achieved outcome, and possibly the credits earned (Rositer and Tynan 2019; European Commission 2020a, 2020b). Importantly, microcredentials are often associated with non-accredited and non-formal programmes, which are less regulated and also not standardized.

Mode of delivery:
Definitions may also focus on the way learning is delivered, frequently leaning on digital and hybrid delivery:

Microcredential courses can be offered in various learning modes, from small units to a full degree (Pickard 2018; Rositer and Tynan 2019). In the current digital age and as a result of the COVID pandemic, they are commonly accessible via online learning platforms. Their association with digital learning could "refer to the format of the credential, its presentation, the mode of provision or dissemination, content, or a combination of these" (Cirlan and Loukkola 2020, 4).

Duration and credit value:
Often definitions are based on the duration of learning activities and programmes:

Microcredential programmes are designed to be completed over a short period of time (Chakroun and Keevy 2018). They cover more than a single course but require fewer credits than a degree. For example, some institutions require learners to complete a minimum of five credits, such as the European Credit Transfer and Accumulation System (ECTS) (MicroHE Consortium 2019; Henderikx et al. 2021).

The European MOOC Consortium[15] is collaborating on a Common Microcredential Framework (CMF) which aims to specify a total study time of no less than 100 hours and no more than 150 hours. New Zealand refers to 50-400 hours (New Zealand Qualifications Authority 2022), while Malaysia provides no specific limits (Malaysian Qualification Authority 2020). In India, reference is made to a small chunk of learning or a "mini course" (10–15 per cent of a regular course).

A microcredential certifies achievement of a coherent set of skills and knowledge; and is specified by a statement of purpose, learning outcomes, and strong evidence of need by industry, employers, workers and/or the community. They are smaller than a qualification and focus on skill development opportunities not currently catered for in the regulated tertiary education system (New Zealand Qualifications Authority 2022).

Certification generally presupposes assessment against a standard, while credentials (as will be shown in this report) may not necessarily follow specific standards, nor is the assessment thereof always uniform — a point returned to several times in this report. In fact, many of the definitions above based on well accepted standards, refer to certificates of short learning processes in the context of educational or accredited training awards.

Drawing on the work of the expert panel (UNESCO 2021a), including both the working definitions, and the updated elaborations across the various characteristics of microcredentials, and considering the four research questions that underpin the study, the basic tenants of a working definition are provided in the continuum diagram below. The table provides a reference point only and is not intended to be comprehensive of all features of microcredentials.

Microcredentials are increasingly promoted as a more flexible way of recognizing knowledge, skills, and competencies. They give learners/students, jobseekers, and employees the possibility to collect and combine smaller units of learning according to their specific needs and, as such, are often seen as facilitating lifelong and life-wide learning (UNESCO 2021b). However, according to the Commonwealth of Learning, microcredentials can mean slightly different things to various constituencies, and the lack of an agreed definition and a global taxonomy makes it "confusing and bewildering to navigate" (Rositer and Tynan 2019).

15 The Common Microcredential Framework (CMF) was developed by the European MOOC Consortium consisting of FutureLearn (UK), FUN (France), MiríadaX (Spain and IberoAmerica), EduOpen (Italy), OpenupEd/, and the European Association of Distance Teaching Universities (EADTU), see https://www.futurelearn.com/info/the-common-microcredential-framework.

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States and regional blocs across the globe have been preparing themselves for the advancement of microcredentials and are developing policies for their regulation, with many having formulated clear notions on how microcredentials relate to formal degrees and the kind of microcredential providers that are acceptable for recognition (NUFFIC 2022).

Table 1. Characteristics of microcredentials

Source: Authors

Characteristic	At least...	Middle ground...	At most...
Features	Record of learning achievement that may be non-formal, informal or formal	Have a defined statement of purpose and learning outcomes and address the need(s) of an employer, industry, market, and/or community	Credential of assessed learning issued by a trusted institution
Purpose	Help facilitate lifelong learning by engaging people in learning activities	Just-in-time and flexible learning that addresses personal, societal, cultural, and labour market need	Result in technical skills and in-demand soft skills that allow individuals to adapt quickly to the ever-changing labour market
Scale	Niche course; small private online course (SPOC)	Stacked into a larger credential or be included in a working portfolio	Various learning modes, from small to larger components of a full degree; integrated into a MOOC/national higher education and TVET system/labour market policies
Delivery	Offered over a shorter or flexible period; may or may not be formal; paper-based or digital	Provided on platforms through collaborations between different organizations, such as businesses, non-profits, and HEIs	Modular, portable, digital, and universal
Rigour	Meets institutional requirements (private or public)	Meets standards required by relevant quality assurance regime16	Meets independent standards, including those set by industry and/or professional associations
Portability	Not recognized as stand-alone formal educational qualification	Contribute to or complement other microcredentials or macrocredentials, including through recognition of prior learning	Have stand-alone value; can accumulate into or be complementary to a formal qualification, larger credential, or degree
Regulation	Exist outside the formal system; unregulated	Early signs of integration into a more seamless regulatory system	Included in mainstream regulatory systems
Ownership	Strong licensing and copyright requirements; student data held by provider; verifications as paid for service	Can easily be shared with employers or social networks through a variety of mediums, including digital platforms	Owned by the learner through adherence to self-sovereign principles

16 The unbundling of the quality assurance process itself is also an interesting option being explored by some countries, notably New Zealand. This entails separating out quality assurance of the course content, course delivery and the learner outcomes.

In a recent review of the Australian Qualifications Framework (AQF) by Selvaratnam and Sankey (2021), a set of guidelines that recognize shorter form credentials, including microcredentials, have been proposed and are being considered for adoption. Similarly, the New Zealand Qualifications Framework (NZQF) in 2019 also set out to establish guidelines for microcredentials (Selvaratnam and Sankey 2021). The New Zealand government already recognizes microcredentials, and there is work being done within the region to make sure that this can happen in cooperation across the board to support portability and validation (Selvaratnam and Sankey 2021).

In 2019, the Directorate General for Training (DGT) under the Indian MSDE has proposed the adoption of an electronic credentialling system in the Indian skilling ecosystem. MSDE's vision focuses on unlocking rapidly growing, young human capital of India by enhancing interactive network between various actors (skill training providers, employers, skill assessors, enablers, and students). The electronic credential system could enhance these interactions that have been suffering thus far from low trust (risk of fake certificates), lack or asymmetry of information (little common context to compare), low portability of skills gained and skills claimed, and low discovery of new opportunities. Consequently, DGT has suggested establishing digital e-credentials/e-certificates that would be freely portable for candidates and easily verifiable at scale by employers and job matching platforms (India 2019). The DGT has planned to leverage e-credentialling specification under Project inCredible, an extension to Open Badges specifications, which proposes a set of electronic standards for machine-readable data to represent various credentials in the skilling ecosystem. This electronic standard enables certificates to be awarded in digital, machine-readable formats, which makes it possible to freely transfer credentials in a trusted and consent-based manner remotely. The standard for credentials would be also internationally compatible with blockchain-based approaches to certification and be built on top of Open Badges V2 specifications (India 2019, 5).

In the European Union, microcredentials have been incorporated into the political agenda throughout various initiatives, such as the European Skills Agenda and the Digital Education Plan.[17] As previously mentioned, efforts are being made to establish a common European approach to microcredentials. The need for such a common approach had also been expressed by the European Universities Initiative and the European Association of Institutions in Higher Education (EURASHE). Several European countries have consequently already opened their NSQFs to include private, international and/or non-formal qualifications and certificates. However, according to a set of case studies being conducted by CEDEFOP, the level of maturity in this regard differs (CEDEFOP 2023):

- ***France*:** The concept and practice of microcredentials is relatively scarce, whereas other related concepts are present (open badges, block chains, block of competences, e-portfolios). None of the few existing microcredentials – mainly in higher education – are in the National Qualifications Catalogue (RNCP). The debate on microcredentials, however, has been taken up in the *Répertoire Spécifique* (RS) and the *Répertoire national des certifications professionnelles (RNCP)* (France 2019).

- ***Germany*:** Microcredentials play a minor role compared to vocational education qualifications and are seen as supplementary to the existing system.

- ***Ireland*:** The term microcredentials is new, but the qualifications authority, Quality and Qualifications Ireland (QQI), has been validating small volume courses and certifying the resulting learning with formal qualifications in the NQF for many years.

17 The European Commission's Digital Education Action Plan 2021–2027, adopted in September 2020, is available on their website at: https://education.ec.europa.eu/focus-topics/digital/ education-action-plan.

- ***The Netherlands*:** The Dutch TVET policy was revised during the last government period (2017–2021) to prioritize flexibilization of educational programmes for jobseekers and employed adults as well as create more opportunities for lifelong learning. The Dutch searchable register of qualifications, *Nederlands Kwalificatieraamwerk* (NLQF), has several parameters, including "workload" and registers qualifications of all sizes (including those with very low workload) and different types of providers.

- ***Spain*:** Employment authorities are preparing a reform of non-formal non-accredited training for employment addressed to employed and unemployed workers that will consider microcredentials, linked to the Catalogue of Training Specialities managed by the national public employment services.

- ***Slovenia*:** Microcredentials can potentially play a role in labour market-oriented education and training that relate to national strategic development priorities, which are defined in the Slovenian Smart Specialization Strategy.[18]

Microcredentials are not limited to a particular NQF level or sector of education and training. Where microcredentials have been included in the NQF and are accepted (for example, in the UK), they can be allocated at any level. In most partner countries of the ETF, microcredentials are not yet part of the NQF (ETF 2022). Moreover, there is also a lack of widespread agreement on how microcredentials should be situated with respect to existing qualifications. The OECD argues that microcredentials based on stand-alone education programmes are not sufficient for level completion and those not clearly linked to a wider educational programme currently have no defined place in the International Standard Classification of Educational Qualifications (ISCED) classification,[19] which "limits the interpretability of microcredentials beyond specific institutions or collaborative networks, or (at best) national contexts" (OECD 2021a, 5).

In some jurisdictions like Malaysia, the government has launched microcredentials guidelines for HEIs to help them ensure that their microcredentials are well accredited and validated should they develop them (Ahmat et al. 2021). Some of the universities that have taken this challenge up and are offering microcredentials are *Universiti Sains Malaysia*, University of Malaya, and *Universiti Teknologi Malaysia* (Ahmat et al. 2021). How this happens in Malaysia is through credit transfer and the accreditation of prior experiential learning (APEL) where microcredentials offer "courses or units from an accredited programme that the learners can submit for credit transfer consideration to any higher education providers" (Ahmat et al. 2021, 285).

Quality assurance (and by implication verification) and its relationship with a qualification are seen as essential for the recognition of microcredentials. Generally, quality assurance of microcredentials is seen either under existing institutional or programme accreditation arrangements in TVET and higher education institutions, or as part of the certification and assessment process per national authorities and agencies, labour market stakeholders, and non-formal education and training providers (ETF 2022). Other forms of quality assurance include links to qualifications systems[20] or to labour market regulation, with the professional bodies and companies which issue the microcredentials being responsible for their quality assurance, using their own specific criteria (ETF 2022).

18 More on the strategy is available on their website, available at: https://www.eu-skladi.si/portal/en/post-2020-1/programming-1/slovenian_smart_specialisation-strategy.

19 ISCED defines a qualification as an award leading to the completion of an entire education programme at a specific level of education, or completion of a stage of a wider education programme.

20 See the quality assurance principles for qualifications that are part of national qualifications frameworks or systems referenced to the European Qualifications Framework (EQF) (European Commission 2018).

According to a survey conducted by the European Training Foundation (2022), many countries are looking at getting microcredentials recognized through credit recognition and accumulation schemes, so that they count towards a qualification, or through their inclusion into the NQF, where possible.

At the level of national education systems, governments through the education ministries and skills development authorities are starting to develop guidelines for the design and implementation of microcredentials by HEIs. The institutions themselves have followed suit by developing policies that address the need for creating an environment where microcredentials can thrive and form an integral part of the formal system as highlighted in the examples above. However, quality assurance processes differ, and not all microcredentials are quality assured based on the nationally established quality standards; this has been the bone of contention and mistrust surrounding microcredentials. In some cases, quality assurance procedures and regulatory frameworks have not yet been adapted to facilitate and monitor digital provision or emerging microcredentials. Orr et al. (2020, 15–16) therefore urges that:

> … existing criteria and measures used for quality assurance be renewed and supplemented accordingly, to take appropriate account of digitalization in teaching and learning, and to ensure security and transparency for all learner groups. In summary: all credit-bearing and stackable microcredentials must be aligned to a standardized and accepted quality assurance process.

Dublin City University (DCU), one of the ECIU's member institutions, has already launched its first stackable and credit-bearing microcredential, and there are others in the pipeline. Before it launched this microcredential, DCU had to introduce the concept of microcredentials into its academic regulations and quality assurance processes. As such, they will need to follow the universities' external institutional quality assurance processes, which means, they are responsible for the quality assurance of their own programmes and services including microcredential offerings (Orr et al. 2020).

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A working definition of microcredentials

Definitions of microcredentials range from "all manner of shorter forms of learning experiences, irrespective of type, size or delivery mode" (Brown et al. 2021b), to "any formal credential that covers more than a single course but is less than a full degree" (Pickard 2018), to the recent (June 2022) definition adopted by the Council of the European Union (2022):

> … the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes will have been assessed against transparent and clearly defined criteria. Learning experiences leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, cultural or labour market needs. Micro-credentials are owned by the learner, can be shared and are portable. They may be stand-alone or combined into larger credentials. They are underpinned by quality assurance following agreed standards in the relevant sector or area of activity.

According to the UNESCO report *Towards a Common Definition of Micro-credentials* (Oliver 2022), a microcredential:

- provides a record of focused learning achievement verifying what the learner knows, understands or can do;
- represents competence on a narrow set of defined learning outcomes, typically achieved over a short time;
- includes assessment based on clearly defined standards;
- is awarded by a trusted provider;
- has stand-alone value but may also contribute to or complement other credentials (e.g., other microcredentials, degrees, qualifications, etc), including through RPL; and
- meets the standards required by relevant quality assurance bodies.

An elaboration of the terms "micro" and "credential" is provided below, followed by a proposed working definition.

Micro is a term that means "extremely small" and "minute in scope".[21] When the term is interpreted within the context of qualifications, and the recognition of learning more broadly, it signals a small chunk of learning that can be recognized and packaged in a way that is commonly understood by society. It also signals that these chunks of learning are "stackable" in that they can be accumulated by a learner and interrelated in the same way that puzzle pieces may fit together. What is meant with this reduced scope is mostly quite ambiguous, but consensus internationally suggests that the volume of learning would be less than a professional qualification, and that the commensurate time taken to complete the learning could be anything between a few hours, a few months and even up to a year.

Credential is a term that can be used to mean "the abilities and experience that make someone suitable for a particular job or activity, or proof of someone's abilities and experience".[22] Abilities and experience can be gained in the formal education sector, but also in informal and non-formal contexts. In this sense, the term signals something that is closely aligned to the conventional interpretation of a "qualification" but is also wider and more comprehensive.

21 https://www.dictionary.com/browse/micro

22 https://dictionary.cambridge.org/dictionary/english/credential

Combining these interpretations, the following working definition is proposed

A credential is the representation of recognized verified learning achievements, independently of the context and way in which the corresponding skills, knowledge and attitudes have been developed.

Verification can take place across at least three levels: self-verification; peer-verification; and independent verification (also referred to as the gold standard). Self-verification corresponds to cases in which users take the responsibility to autonomously obtain a certificate to verify the credential on request by a third part (e.g., a hiring company).

A **microcredential** is a building block of a credential. Microcredentials can be stacked into credentials. Microcredentials are most often associated with the completion of a short training programme, but could also be components of other traits, such as professional status, citizenship, or financial surety.

A **macrocredential** may consist of a stack of microcredentials, or it may be a credential in its own right. Macrocredentials are most often associated with the completion of more extended training programmes that included independent verifications, such as qualifications.

When framed by a self-sovereignty approach, credentials allow users to autonomously exert authority over the relevant data, easily accessing it, and utilize it in relevant, exchangeable formats. Self-sovereignty is based on three principles: i) existence: users are able to exist in the digital world without the need of a third party; ii) control: users have ultimate authority over their digital identities and personal data; and iii) access: users have easy and direct access to their own data.

It is the authors' view that the increased seamlessness of different types of credentials will be inevitable as digital standards become more interoperable. It is important, however, to take note that this view is not uncontested and implies several risks. The final section of this report will return to this point by specifically looking at equality, sustainability, and data sovereignty as globally acknowledged ideals. It is the authors' view that digital transformation of learning systems has the potential to protect the vulnerable and provide equal access to all.

Among the key considerations for how microcredentials can be approached is the observation that learning outcomes have become pervasive and provide a common currency between the world of work and education and training systems. This common framing allows bridging across supply-side systems, like qualifications frameworks, and demand-side systems, like occupational and skills classifications and job matchings. In addition, interoperable data platforms are being constructed to facilitate the many credentials that can be linked to a human, to capture and protect digital identities, and to manage such ecosystems through distributed governance.

Section 3
— Examples of practices

Key points

Current uncertainties of microcredentials in relation to quality assurance and recognition are resulting in a call for standards to be developed at national, regional, and international levels.

A strong equity feature is ascribed to microcredentials in an aspirational manner. Examples include individuals in the informal and rural sectors, individuals lacking soft skills in the workplace, school dropouts, and those without tertiary education access, as well as links to rewards and promotions.

The technical distinction between non-fungible tokens (NFTs) and verifiable credentials (VCs) is important for the future implementation and conceptualization of microcredentials to ensure that data privacy principles are protected, while the potential of digital technologies can be harnessed.

Microcredentials may improve labour market signalling, given the appropriate conditions, contributing to better adjustment of skills offered vis-à-vis vacancies' requirements.

The effect of microcredentials on youth employability is variable and dependent on their labour market currency, which in turn reflects the trust they enjoy as well as their quality. There are secondary benefits outside of being employed as youth gain increased digital knowledge from microcredentials.

This section comprises four illustrative cases of microcredential implementation with a focus on LMICs, ranging from a country (India), a sector (health), a company (Microsoft), and a youth initiative (Yoma). The examples aim to provide an illustrative case-based discussion, that exemplify a broad span of applications. While the examples are not representative of sectors, they provide a basis for discussion and exploration with a special emphasis on youth perspectives, particularly those who are starting their career, or inactive qualified youth searching for employment. Further research is recommended regarding outcomes and impact for their full characterisation.

Microcredentials as part of national systems: India

India has made strides in making pedagogies designed to be more skill-specific to match the supply and demand value chain across multiple sectors, both formally and informally. The resurgence of skills development in India started with the Skills India Campaign in 2015 (NSDC 2019). There are two kinds of TVET streams in India: (1) long-term streams where a one-year or more course is offered by training institutes; and (2) short-term training courses (STTs) ranging between three to six months for a particular qualification or standard. However, it was difficult for professionals who were already employed and looking for upskilling to be trained while working, or the training was unaffordable. This is particularly problematic for unorganized labour (i.e., those with experience but without certifications or qualifications). To minimize the negative impact on their livelihood and job security/productivity, often the preference was to learn in small chunks. The idea of short, industry-driven certification-style qualifications is not new in India. In fact, it started advertising short-form computer courses designed to be accessible to a variety of people, regardless of socio-economic status in the 1980s and then later with MOOCs, mostly in ITC (NSDC 2019).

This was further enabled by India's education policy which is currently advocating for more skill-specific industry and market-driven courses for its students. As a result, the Indian government has made policy shifts in education and initiated programmes to provide the best teaching/learning resources for all, including the most disadvantaged, via agile, flexible, blended, and online platforms. Various Sector Skills Councils (SSC) in India have followed suit, and together with various private and public providers targeting both formal and informal sectors, STTs and microcredentials are seeing an upsurge, especially since COVID-19.

Some universities are seeing the business and social opportunities of microcredentials. One such university that is making strong headway with this is Ajeenkya DY Patil University (ADYPU). In response, and in keeping with innovation, this Indian university has focused on building numerous microcredential courses within its programme curriculum, which are delivered through the provisions of electives, courses with industry tie-ups, and courses with formal industry certification. The courses are identified annually keeping in mind industry requirements.

There is, however, no formal policy guideline on microcredentials in India yet. On 18 July 2022, the National Council for Vocational Education and Training (NCVET) released the draft *Guidelines for Development and Usage of Micro Credentials,* and when promulgated will ensure better industry recognition thereby facilitating the "use of already available knowledge and the National Occupational Standards (NOSs) of different qualifications based on their ability to ensure quality and their capacity" (NCVET 2022, 5). Until then, microcredentials cannot be developed formally but rather on an ad hoc basis, based on industry needs in specific sectors where industry partners are open to it. Sector councils are also looking at how microcredentials could be built onto a larger qualification. It will also permit all NCVET-recognized awarding bodies to develop a NSQF which will align microcredentials in accordance with the prescribed norms listed in the guideline.

Interestingly, although the microcredential nomenclature in India is not well known, due in large part to it not being formally gazetted, India has implemented a slew of STT initiatives through its various private public partnerships (e.g., *eSkill India, Made in India, Digital India, Swachh Bharat, and Common Cost Norms*). These are by and large microcredentials, as they are agile, flexible, stackable, and industry-approved short courses (from a few days to a few weeks). The recognition of prior learning (RPL) plays a key role here also especially when offering such courses for the unorganized (informal and non-formal) labour markets.

Despite microcredentials (or what is termed as STTs) not being formally recognized in India, the benefits of microcredentials are known. Based on key informant interviews conducted as part of the information gathered, it was clear that microcredentials can:

- promote continuous learning;
- respond dynamically to industry needs in an agile and flexible way;
- allow for horizontal and vertical progression in an organization;
- contribute to career progression;
- assist with sourcing funding, e.g., from banks for the informal sectors; and
- open opportunities for stackability with existing qualifications.

The Indian Government is recognizing the importance of microcredentials, which is why they have released the draft guidelines to the public for comments. As such, the value of microcredentials for India's labour market is perceived to be high, and this will undoubtedly grow within the industry once it is formally promulgated. However, industry, especially the corporate sector, needs to build awareness of the benefits of microcredentials and recognize them. Also, financial compensation needs to be in place so that participants are not hindered by their participation in microcredential training.

Well established sector use: Healthcare sector

This thematic deep dive focuses on an example of a highly regulated sector where the implementation and uptake of microcredentials is well-established, zooming in on upskilling and reskilling workers in personal care and community health-care services. The health sector was selected based on the evidence that the sector awards the most certificate programmes, and, in the aftermath of the COVID-19 pandemic, there has been an increased number of mechanically ventilated patients in hospitals (AACN 2020; WHO 2020 and 2021; GIZ 2021).

Microcredentials are often used in healthcare to provide focused training to professionals and upskilling opportunities in specific areas in an accessible, and more flexible manner than offered in traditional degrees. This, in general, tends to be the tendency in sectors with highly regulated occupations. For this reason, quality assurance standards and the connection to practical skills development of trained professionals tend to be the key concerns in microcredential implementation in healthcare. Microcredentials may also provide an important support for the recognition of experience of seasoned professionals.

As country examples, the focus was on the health sectors of the Philippines and Romania. The Philippines has bilateral agreements with Germany (GIZ – Triple Win) to train Filipino nurses to meet German health-care requirements and relocate to Germany, while Romania has an interesting application of RPL that potentially matches well with microcredentials. Despite the matured use of microcredentials in the sector, there is hardly any evidence of a targeted approach to use microcredentials as an enabling factor for youth to access qualifications and decent work and seize career opportunities in health-related occupations. While other national examples may be different, the cases of the Philippines and Romania do not suggest that youth are the focus of microcredential initiatives in either country. Instead, the implementation, uptake, and recognition of microcredentials was seen to be at a nascent stage in Romania, while in the Philippines the main programme making use of microcredentials at a national level was that of the GIZ Triple Win Project (GIZ 2021), that aims at enabling worker migration Germany.

Findings rather suggest that, besides continuing professional development of healthcare workers, microcredentials may be useful to enable experienced lower-level care workers (whether formal or informal) to seize opportunities in healthcare and community care (information gathered in the example from India).

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Enabling employees' and aspiring IT professionals' access to microcredentials: Microsoft Corporation

Microsoft provides an interesting example of microcredential application within a corporate environment, having developed platforms that provide access to short learning programmes to their employees and the public. The **Microsoft Learn** platform includes Microsoft certification courses for roles such as administrators, artificial intelligence (AI) engineers, data analysts, data scientists, security engineers and solution architects. In addition to formal courses, digital badges are available for training sessions and learning opportunities. **Microsoft Viva** platform will assist employees to pursue informal development in line with their personal and professional goals. Although this system does not leverage the term "microcredentials" — favouring instead "short competency-based recognition" and the idea of "skill levels" – ultimately, the purpose and journey that would be experienced by an employee is that which an individual might experience with a microcredential. Viva does not offer credentials or certificates as a core part of its offerings, although courses taken are tracked and recommendations are aligned to career goals and personal profiles.

Microsoft also operates several partnerships, namely National Programme for Employability (*Programa Nacional para la Empleabilidad* – PNE)[23] in Peru, and the Passport to Earning programme[24] implemented by a partnership between Generation Unlimited (GenU),[25] UNICEF, Microsoft, and Accenture.[26] The PNE programme is free and is currently being run with 200 participants. The intention is to scale up to 10,000 in the coming years. Despite significant resources at Microsoft's disposal, reaching the disenfranchised and at-risk of our global community still requires strong partners and a concerted effort from multiple stakeholders, with programmes aligned to the immediate needs and goals of this constituency. The P2E platform offers a global learning-to-earning solution that provides young people with free, certified skills that prepare them for economic opportunities. By the end of June 2023, more than 500,000 young people have completed courses of more than 10 hours and received certificates on the P2E platform – 62 per cent of them were young women.

On the company website, Microsoft explains some of the benefits of engaging Microsoft certifications offered on the **Learn Platform**:

- Thirty-five percent of technical professionals say getting certified led to increased income and twenty-six percent reported promotions.
- IT professionals who achieve a relevant, role-based technical certification perform an average of 26 percent better than their uncertified colleagues.
- Team leaders who support and encourage their teams to get certified can expect a higher performing workforce. Workers are more likely to stay with a company that invests in their skills through certifications.
- Getting a Microsoft certification is also a great way to break into the IT industry. A Microsoft certification conveys expertise, especially helpful for someone new to the industry.

23 The PNE website offers information in Spanish on their programme https://www.gob.pe/empleabilidad.

24 Information on this programme is available at: https://www.generationunlimited.org/passport-earning.

25 More on GenU can be accessed on their website: https://www.generationunlimited.org/.

26 More information on Accenture is available on their website: https://www.futurelearn.com/partners/accenture-uk.

Microsoft has introduced its platforms to encourage employees to seek further learning opportunities and continually improve themselves, opening opportunities for job mobility and increasing employee satisfaction and retention. Internal skilling is informal, without qualifications linked to any national framework or formally recognized educational qualifications. Externally, Microsoft offers badges to completers of courses and tracks progress of its registered learners on the Microsoft Learn platform. Microsoft certifications do expire unless they are renewed, which can be done for free and by taking a short refresher exam covering only software updates and other such information. If certifications are not renewed within a year, then the courses and/or examinations must be retaken from the beginning.

As with any ambitious and innovative undertaking, lessons have been learned along the way. One of these is related to two types of fraud: misrepresentation of/by individuals as certified when they are not, and fraud related to the misrepresentation of individuals sitting exams for certification. Microsoft stakeholders explained that verification mechanisms are in place. The badges that serve as the certification have metadata that supports verification, and there is a tool for people to send their certificates for verification. However, stakeholders were not sure how often these instruments were used in practice by those employing Microsoft certified staff.

Findings indicate that within the IT sector, the need for formal qualifications may be waning and can be substituted for by a concrete demonstration of skills and/or prior experience. The company's efforts towards inclusion and equity should also be noted, in particular the value Microsoft executives see for diversity in relaxing university requirements for hiring, the importance of accountability, and transparency in pay and pay equity. The microcredentials on offer from Microsoft demonstrate the currency of industry-led certification in the IT sector. The value of these certificates is generated based on the reputation of the company and its direct links to the products being certified — a Microsoft credential on Amazon Web Services (AWS) or Oracle may not be as well-received as a certification on an actual Microsoft product.

Youth programme utilisation: Yoma

Yoma[27] is a digital platform that aims to create an ecosystem connecting African youth to skilling and work opportunities, particularly in the ICT sector. Partners of Yoma contribute content and challenges, including courses and certificates offered by Google, Meta,[28] and AWS. Partners such as Goodwall[29] also offer opportunities to respond to challenges collaboratively or individually, which could be as simple as writing a reflection about a mentor or leader, or as complex as designing a local solution for the COVID-19 pandemic. The organizations invested in the Yoma ecosystem share a common philosophy that youth can be more effectively engaged and upskilled through short courses and certifications than they can through traditional post-secondary education, and that online courses and upskilling can translate into job placement and entrepreneurship opportunities for youth.

Youth were involved in the development of Yoma as a platform, to help ensure it met the needs of young people. The information gathered explored the perceptions of youth on the benefits and limitations of microcredentials, as well as their experiences in completing, or not completing, their certificates. Platform developer DIDx and platform partners Goodwall, Umuzi[30] and UNICEF also contributed their impressions on the purpose, achievements, and future plans for the platform.

27 The Youth Opportunity Marketplace (YOMA) offers an online platform for youth which provides opportunities to develop skills, engage with a community and access employment. More information is available on their website at https://www.yoma.africa/.

28 Meta is the company previously known as Facebook.

29 Goodwall is another group offering an online platform for youth to link them to skills development opportunities and access employment. See their website at: https://www.goodwall.io/.

30 The Umuzi website is available at: https://www.umuzi.org/.

Learnerships are generally understood as work-based learning (WBL) programmes that lead to registered qualifications aligned with national qualification frameworks. These, along with other intensive support initiatives leveraging similar courses and credentials, have shown up to 80 per cent job placement rates for those completing the courses. However, to take Yoma to scale, the amount of support had to be dramatically scaled back, leading to an anticipated lower placement success rate. Stakeholders noted that due to the increasing volume of participants, the number of learners, as well as their distribution across the continent, could be higher than the earlier programmes, with a lower cost-per-learner.

The delivery of these credentials outside of the formal education system has opened doors for educational and entrepreneurial opportunities. In some cases, completion of microcredentials has contributed to applications for formal education programmes. In others, youth have taken up their own money-making opportunities, or plan to leverage skills gained for their own existing businesses.

However, the youth interviewed often reported that a certificate programme may not be sufficient to open doors to even entry-level employment, and that in many cases this expectation is mismatched to the requirements of the positions. Participant reflections suggest that the expectations for career placement following only a certificate programme may be too high, particularly when these courses are not paired or coupled with industry placements, and that youth without post-secondary school experience may enter these credential courses with unreal expectations and poor understanding of the differences between certificates and degrees. This clearly indicates that to make better use of microcredentials, young people require updated information and advice on how to select, value, and use them, as well as develop career management skills, that enable them to effectively identify and act upon career opportunities. On the other hand, youth with existing qualifications that pursue these programmes typically do so for their own personal or professional advancement, often not leveraging them on CVs or job applications.

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Key observations gathered from evidence and literature

Main characteristics of microcredentials

The insights gained from the thematic deep dives above resonated well with the review of relevant literature. A strong theme was the current uncertainties of microcredentials in relation to quality assurance and recognition, with a call for **standards for developing microcredentials.** Due to the lack of national policies and guidelines, in particular in the Indian case, some civil society and training providers argued that microcredentials can only work if the curriculum has what industry needs, and aligns with existing standards. Current work in the European context to establish microcredential guidelines include the adoption by the Council of the European Union in 2022 for a proposed recommendation on a European approach to microcredentials (Council of the European Union 2020, 2022).[31]

It was felt by the organizations interviewed that the reason for the slow uptake of microcredentials into the education system was the lack of a common framework. From the Microsoft example, it was found that common frameworks are being pushed more by the private sector, through companies such as Google and Meta, where the digital sector is leaning towards microcredentials. Eventually national systems will have to follow.

Modularization of more intricate and longer duration certifications was identified in the thematic deep dives analysed. A number of informants described microcredentials as an unbundling of learning opportunities into discrete packets, described by learning outcomes, and often supported by credit systems. With microcredentials, an individual can take the critical bits, prioritize, and pick the desired programmes, with no requirements in terms of what, how many, or when. Learners can therefore look at a range of catalogues, not just one university, and can further curate their own experiences that are tethered to their needs. However, modularized content is still reflective of standardized content, clearly defined learning outcomes, assessment and, in many cases, support from existing credit systems, particularly quality assurance bodies.

The thematic deep dives contribute to the view (real or perceived) that microcredentials hold value based on **the trust they enjoy** and a **specific industry sector's acceptance.** It was strongly noted that the key to the success of microcredentials is in the constant, good relationship with employers, being up to speed with latest industry needs, and having very good trainers (specialists) that can facilitate the training content well. The development of the Indian system underlines that while market acceptance may still be relatively low, the leather, textile, and automotive sectors provided good examples of how microcredentials have been implemented and the impact they have been yielding, although further evidence of impact is still needed. Despite these examples, key informants made it clear that industry acceptance within India (especially by employers) was still lacking, indicating the need for greater quality assurance, awareness-raising, and employer engagement.

Key features attributed to microcredentials include being an **alternative approach that offers flexibility, accessibility, and affordability**, with claims that this would lead to career advancement and to enhanced job security. This, however, presupposes that microcredentials have currency in the labour market and can be effectively used to not only acquire skills but be stacked and combined towards partial and full qualifications. The possibility of using microcredentials in career advancement also assumes that individuals understand their value and can use them as enablers to pursue career pathways, for which they may need career guidance support.

A strong **equalizing/equity feature** is ascribed to microcredentials. Examples of this include individuals in the informal or rural sectors where unorganized labour and those not in employment, education, or training (NEETs) are prevalent, particularly in the Indian example,

31 See further European Union background information on the proposed Recommendation at: https://education.ec.europa.eu/education-levels/higher-education/micro-credentials.

with the claim that microcredentials assist disadvantaged people to transition themselves out from informality to formality. Other reported examples of this equalizing effect include individuals whose soft skills in communication and behaviour improved after taking microcredential courses. This indicates that the potential of microcredentials is enhanced by appropriate integration in outreach initiatives and other activities to promote social inclusion through flexible learning. In the case of Microsoft, it was noted that diversity and inclusion is linked to rewards and promotions. Microsoft has widely advertised the fact that it does not require college degrees for entry-level positions, and executives claim that this supports their diversification efforts.

The **status of the microcredentials** (i.e., formally recognized or offered outside of the formal system) also featured strongly in the analysed thematic deep dives. Apparent contradictions were noted in this regard, as informants clearly valued features such as flexibility and alternative approaches, but at the same time, placed high value on the official recognition of microcredentials. This is indicative of the need to assign to microcredentials some characteristics of more traditional credentials, namely guarantee of quality, acceptability, and trust. An important step in this direction may be the translation of microcredentials into learning outcomes linked to quality frameworks.

Duration or scope was another unsurprising feature of microcredentials that emerged from the analysed thematic deep dives. There was consensus that microcredentials should be "shorter than a certificate or diploma". Similarly, information from Yoma stated that microcredentials are:

> … not that data heavy. It is a 'micro fact' that endorses that you have a skill. A verified credential that endorses that you have a skill.

In the case of Microsoft, the term "microcredential" was in fact not used in internal conversations or to describe its training or certificate programmes. For example, a Microsoft stakeholder explained microcredentials as a "…very focused skill set, something that validates a focused skill set, rather than a job area, it would be a grouping of roles within that job."

Common themes related to microcredentials

Interviewees noted that microcredentials can be helpful in niche and specialist areas. For instance, it was reported that microcredentials in some informal sectors assisted with sourcing funding from banks when applying for a microloan. Microcredentials reportedly also lead to improved employability for e-hailing services such as Uber and Ola, and for service technicians (including promotions or increased salaries).

Microcredentials were often seen as an easy way to **"upskill" and respond to changing needs in the industry**. Informants often viewed microcredentials as being "based on the specific industry requirements or development needs of the employee", including linking microcredentials with a faster route to specializations:

> … people in this sector have to specialize because this is a high-volume industry and moves fast, but [one] cannot teach everyone everything all at once, it's not possible. So, you need someone who knows a special specific skill …[and] that specialization is a microcredential (anonymous source).

The **early stage of regulation** of microcredentials also came through as a key theme, although through several different perspectives. Indian respondents were eager to formalize microcredentials to gain credibility in regulated sectors, such as aerospace and aviation. In other cases, it was suggested that formalization would lead to increased inflexibility, defeating the very purpose of microcredentials to be more agile and responsive to industry needs. This tension runs through the set of selected thematic deep dives: On the one hand, microcredentials need more formalization to gain acceptance from industry; on the other hand, microcredentials should remain informal, agile and outside the regulated system. From the Indian case there was a strong view that even if a certificate is designed in-house and is linked explicitly to the name of the company, it will not hold value unless it integrates in a credit-based or qualification system associated with mainstream education and the TVET space.

The **appeal of microcredentials to youth** was a strong theme, notably from the Yoma and Indian thematic deep dives. Informants argued that microcredentials are very appealing to young and unskilled workers, as well as to professionals already in employment, because of their flexibility and short, direct, and focused learning bundles, leading to more rapid absorption and application in the workplace. It was also argued that microcredentials were well suited to the way youth learn and access knowledge: "Youth don't want to be forced down a pathway; they don't want to be pushed. We need agency for the youth."

Despite the appeal to youth, it was also noted that **microcredentials may be associated with unrealistic, or at the very least, untested expectations**. This highlights the fact that many young people may be insufficiently informed about the quality, currency, and utility of microcredentials, thus not making the best use they can of their availability. Notwithstanding these challenges, informants were generally positive, sharing the view that microcredentials could enhance job security, employment, job creation, promotion opportunities and lateral movement. The Yoma youth programme illustrated this very well as shown in the extract summarized in Box 1 below.

Box 1.
The Story of Kgomotso

Kgomotso is an entrepreneur in a rural area of her country, where she sells mango relish. She is ambitious and dedicated to her own development and has found and pursued several microcredentials and learning opportunities offered. She has taken microcredential courses offered by the Africa Coding Initiative, Umuzi, the European Business University, Wethinkcode and others in hopes of developing herself and attaining gainful employment. Her goal is to become a software engineer, and she is currently enrolled in a diploma. Kgomotso is tenacious and undeterred by setbacks. Previously, she studied to be a chef, but found that there were few opportunities to pursue this profession in her small town. After this, she pursued a short course in Teaching English as a Foreign Language (TEFL), which she completed, hoping to go abroad or teach online as a "side hustle". However, the positions required degrees and she was not successful finding employment as an English teacher with a short-course credential.

She failed the Umuzi assessment but pursued available microcredentials while waiting to retake the exam. One of these was a course from Meta in media marketing, "by default, just for the advantage of learning something" and also because she is "interested in how social media has become 'the street' of our time" and feels she needs to learn to navigate that space. At the same time, she enrolled in a course for marketing analytics.

Following her course at Umuzi and the Africa Coding Network, she enrolled in a two-month short course from the European Business University. But because the course was time-bound and there were ongoing challenges with electricity in her area, she was not able to finish. When asked about course completion and drop out, Kgomotso calmly declared, "I did not drop out. I had to discontinue because there were no lights, and I couldn't go anywhere. We were without electricity for four months." During these electricity outages, Kgomotso went to other people in her network who did still have electricity, but "they got tired of helping her" and she had to return home. She notes, "Discipline is important for online courses. You do it alone, and you must manage your time. There are many distractions at home." She has now taken up a coding course, and she wryly concludes, "So if the lights stay on, I should be able to take up that course. What I have learned is that time and God have a plan. In time, everything will work out."

The **link between microcredentials and recognition of prior learning (RPL)** is another important theme emerging from the thematic deep dives and literature. Currently, most of the developments around microcredentials are happening outside of formal systems of education, training and assessment. Their recognition is very limited and has an impact on their currency within the labour market for those that decide to pursue them. RPL processes present the possibility to recognise experience obtained outside formal systems, including non-formal learning, and potentially integrating microcredentials. Microcredentials present an alternative to demonstrate knowledge or expertise in a particular subject or skill, being used to showcase skills and knowledge to potential employers or educational institutions. Issuance by trustworthy, accredited organizations, with quality-assured courses increases the value of microcredentials for recognition and validation purposes. Overall, the rise of microcredentials is challenging longstanding notions of what it means for learning to be considered formal, non-formal or informal.

A **lack of awareness and consensus around what microcredentials are still exists**. For example, an informant from Romania admitted to being a "little confused" on the topic and said, "I was thinking why do we have a new concept — microcredential — and why don't we use partial qualifications anymore? So, I was confused." Informants in Microsoft asked for a definition of microcredentials, pre-empting one of the interview questions, and youth who were not currently engaging microcredential courses also required explanations of the concept before they could answer additional questions.

While research on actual impacts of microcredentials is still lacking, an informative and concrete set of **impact areas of microcredentials** were identified by the company Apollo Medskills, as part of the health sector thematic deep dive. These included employment generation, livelihood outcomes, women's empowerment, and even some clinical outcomes in government hospitals have improved, with additional reports of improved health outcomes.

Ownership of the microcredential was also an important theme emerging from gathered evidence. This ranged from a basic interpretation of the statement of certification, to the case involving Goodwall, which expressed ownership as connected to the concept of self-sovereign identity (SSI). SSI is an approach that empowers individuals to control and manage their personal data and digital identity, not necessarily through a centralized authority or intermediary. This is generally achieved through ledger technology, normally blockchain, allowing individuals to tailor with whom and what they share.

The delivery of **work-based learning (WBL) and continuing professional development (CPD)** through microcredentials was also a strong theme. There is evidence of CPD in the context of specialisations for regulated occupations, but also in other environments. As an example, a UNICEF informant described a microcredential as a *"facet of a work-based opportunity that is accredited to a learner and recognized within an ecosystem."* Similar findings emanated from the Microsoft, India, and health sector thematic deep dives.

The **link between career development and microcredentials** did not feature strongly in the evidence, and neither did the **link between financial incentives to microcredentials** (e.g., learning accounts). This arguably reflects a generalised lack of structured career development support associated with the utilisation of microcredentials, as well as still limited national experiences in the development of individual entitlements to learning. Experiences from France, however, demonstrate that individual learning entitlements are being used to enable individuals to access training through microcredentials, available also to disadvantaged groups, and allowing for tailored learning pathways.

Different types of microcredentials

Microcredentials were commonly associated with being **digital and offered online** by many informants across the four thematic deep dives. This included Microsoft partner organizations, stakeholders, GenU and others. The fact that microcredentials need not be limited to online delivery did not feature strongly in the thematic deep dives. On the contrary, internet access and the limits of learning without mentoring was noted as essential for completing a microcredential, citing **a stable internet connection**, which further requires a **steady**

electricity supply. This is not always guaranteed, particularly in some developing countries and rural settings. There is also the fact that these courses can be a rather lonely experience for students, given that they are exclusively online, without mentors or peers for advice. As such, microcredentials require discipline regarding time management and navigating home distractions, which may not always be easy.

Credit-bearing microcredentials were strongly advocated by some key informants as a prerequisite to becoming mainstream. This sentiment was strongly linked to provision in higher education, but mention was also made of the vocational sector. The increased costs associated with compliance to formal requirements was noted as a limitation. For example, the Umuzi programme, which was accredited and aligned to government requirements in South Africa, boasted an 80 percent placement rate — although it was more than four times the cost proposed by the Yoma platform.

Different levels of validation for microcredentials were noted, ranging from self-attested, peer reviewed or externally quality assured. As an example, the Microsoft skilling platform Viva does not offer credentials or certificates as a core part of its offerings, although courses taken are tracked and recommendations are aligned to career goals and personal profiles. As a case in point, company stakeholders perceived a limited value in badges and unvalidated recognition such as peer endorsements but also emphasized that for a recognition system to have meaning it must be aligned to a fully developed framework of competencies linked to purpose, in this case job performance and career advancement. Validation of alternative learning pathways like badges, electronic certificates, and other forms of microcredentials can take many different forms.

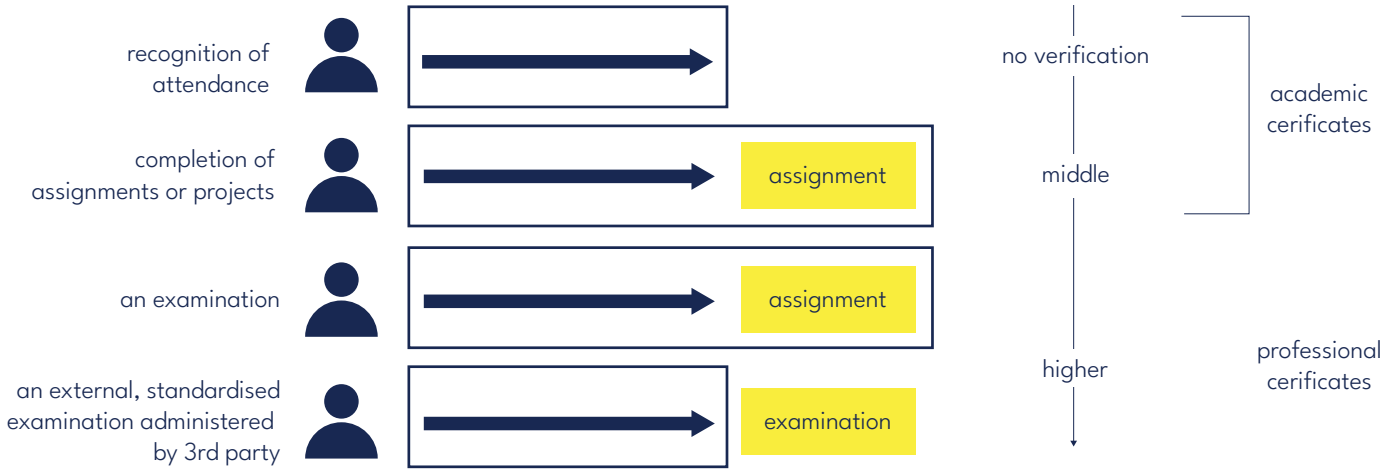
An important consideration in this regard is the impact of blockchain-based systems on formal validation processes, which has provided the basis for two technical concepts that are often confused:[32] non-fungible tokens (NFTs) and verifiable credentials (VCs). NFTs are cryptographic tokens stored on blockchain and cannot be replicated, while VCs are tamper-proof constructs that can be verified cryptographically. This distinction is critically important for the discussion on microcredentials, as it relates to aspects of both representation and data privacy. **NFTs are publicly displayed and captured in an immutable blockchain, while VCs are privately held and can be verified using blockchain but do not need blockchain to be implemented.** This distinction is important for future implementation and conceptualization of microcredentials to ensure that data privacy principles are protected, while the potential of digital technologies can be harnessed.

It could be argued that these **self-sovereign systems enhancements could result in existing accreditation systems becoming obsolete in the near future**. This seems to be the route in several countries, such as in Cyprus, Croatia, Malta, and others (CEDEFOP 2022b; CEDEFOP et al. 2019a, 2019b). At this point in time, the validation of microcredentials remains on the periphery and not part of the formal system, although there are efforts to change this through policy and legislation in different parts of the world. The figure below shows the different types of validation processes and the levels of verification associated with each process pathway.

32 Background discussion on NFTs and VCs is available at: https://academy.affinidi.com/non-fungible-tokens-nfts-vs-verifiable-credentials-vcs-cd0ebb13f1fb

Figure 1: Different forms of validation processes

Source: Kato et al. (OECD) 2020.



What are the challenges and opportunities associated with microcredentials?

Both the thematic deep dives and the literature review highlight far more opportunities than challenges. At the same time, the current global interest in microcredentials is contributing to a situation where unrealistic expectations may be created. Setting realistic expectations is an important exercise that requires the identification of real opportunities within a complex reality. The summary below provides some insights drawing on the available literature and the interviews implemented.

The authentication of learning is arguably seen within corporate environments as being enabled by microcredentials. An informant from Microsoft argued that badges that serve as the certification have metadata that supports verification, and there is a tool for people to send their certificates for verification. However, their currency is not universally guaranteed, and when looking outside a contained corporate reality we find a different picture.

The Yoma thematic deep dive provided a sobering insight in that microcredentials may not always result in higher or immediate employability outcomes for young people, despite **secondary benefits outside of being employed,** as youth also gained increased digital knowledge from the microcredentials. Specific examples included one student who took up social media marketing, which taught her skills she could use in her own business; another who gained knowledge of data analytics and discovered a love of data; and yet another who studied user experience (UX) and is now freelancing for NGOs and creating mini projects to add to her portfolio, in hopes of leveraging these and her certificate for career entry. Students felt empowered by these courses because it helped populate their CVs, in addition to the upskilling they received.

It was also claimed that microcredentials **could lead to being hired and promoted**. For example, a Microsoft employee indicated that their own research revealed that a high percentage of hiring managers did consider persons with microcredentials with certifications attached.

In terms of getting people hired, it is more likely that a CV is looked at if it has relevant certifications, and hiring managers tend to put those at the top of the pile even if it does not lead to hiring.

The example above referred to Microsoft certifications specifically, while the extent to which microcredentials from non-industry partners (e.g., Yoma) would receive the same status was much less clear. Stackability and articulation of microcredentials with existing qualifications was seen as an opportunity to add to the learner's expertise and build towards a larger qualification, in the case when the microcredential is "recognized".

It should be noted that the majority of microcredentials are currently not recognized in formal systems, although several countries are **contemplating how best to integrate microcredentials into their formal systems** (e.g., Ireland,[33] Malaysia[34] and South Africa[35]).

The **competitive benefit** that software companies have in certifying their own microcredentials, drawing on their existing footprints, is a significant factor to keep in mind. An example from Yoma showed that microcredentials are generally not recognized if they are achieved through small or relatively unknown organizations, such as Goodwall or Yoma, as opposed to Google or Meta. This means that the challenge is to guarantee the trustworthiness of the credentials. The reputation of the providing organization is also important, whether in the formal education system or not; the fact that microcredentials themselves are a relatively new concept further highlights the issue. Reputation can be gained through different channels. In the case of Microsoft, competencies are certified in their own software, lending credibility. Size and general reputation were cited as a factor affecting the acceptance of Google and Meta certificates. Education institutions can leverage reputations gained through other skilling work. For Umuzi, their reputation is limited in scope but strong within a network that has been built over time through direct engagements, work-integrated learning (WIL) relationships and the general reputation of their graduates.

A strong theme emerging is that **improved understanding** of the microcredential concept would assist in better uptake. One informant argued that the continuous dialogue and interaction with employers would add to the employers "understanding" that training quality is distinctly different for microcredentials. Microcredentials were strongly associated with **filling competency and skills gaps**, allowing for vertical and lateral progression and mobility. The value of microcredentials to enhance chances of finding work was noted, while for employers, it was argued, microcredentials can help to acquire more business, especially government tenders, if they are used as an eligibility criterion.

A certain **"stigma"** around microcredentials was also highlighted as a challenge. As noted by a student from the Yoma thematic deep dive:

> "The feeling [that] this is just another short course; it's not going to work out. Everyone just views degrees to be more … they put more value on formal degrees than short-term courses. You must battle that stigma. I'm doing this for me because I see value in this. If no one else sees the value, I do and I know where I'm going with this."

Greater awareness about the value, currency, and appropriate way to utilise microcredentials could be achieved through increased awareness-raising by governments and employers' and workers' organizations, alongside the establishment of quality assurance systems to increase public trust.

A counter position to possible stigmatization is that **microcredentials offered by well-known companies are highly trusted**. As noted in the Microsoft example, while trust is historically associated with formal learning, qualifications and national quality assurance systems, Microsoft and other technology companies have demonstrated that trusted credentials can also be offered by industry. These companies have developed a level of familiarity and reliability with their

33 See the Quality and Qualifications Ireland press release at: https://www.qqi.ie/news/Putting-Micro-credentials-on-the-Agenda.

34 More information on microcredentials in Malaysia is available at the Asia Pacific University of Technology and Innovation website at: https://www.apu.edu.my/webform/micro-credentials-apu.

35 See "On my Radar: Could micro-credentials ease our employment crisis?", online article from the City Press, Johannesburg at: https://www.news24.com/citypress/columnists/dionchang/on-my-radar-could-micro-credentials-ease-our-unemployment-crisis-20220508.

users, so when these companies do offer some form of training, either to their staff or the public in general, their certifications carry more weight than a lesser or even unknown company or organization offering the same training.

There were some reports of a shift by industry **away from formal qualifications and towards microcredentials for entry-level positions**. The IT sector was identified as a case in point. Microsoft was mentioned as one of the companies willing to hire individuals who do not have a formal degree qualification. The willingness of even education departments to engage with a level of skilling outside the formal education sector signals a further shift towards student and industry demand and concrete skills gains as measures of success.

An important lesson to be drawn from gathered evidence is that to the disenfranchised and at-risk community, **strong partners are needed to align programmes with the immediate needs and goals of this constituency**. On the delivery side, a few online providers operating in the informal environment are dominating this space and more of them are transitioning to online. The partnership model that has been employed so far, where some top universities offer courses through online providers such as Coursera, EdX and Udemy, has been the way many users had access to such education, otherwise not available through those universities. Of course, some smaller providers have their own courses that they deliver directly to their students for free for a fraction of the payment of a full university course.

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Section 4
— Conclusion

Key points

Current uncertainties in relation to quality assurance and recognition are resulting in a call for standards to be developed to guide the use of microcredentials at national, regional, and international levels.

With the necessary support and coordination, more of microcredential systems can be developed using open standards with code that can be forked to ensure improved interoperability.

Governments and agencies that engage with concepts and debates related to microcredentials will have a strong advantage and may be able to evolve quickly enough to remain active role players in a transitioning labour market that already includes microcredentials.

This final chapter provides a set of key considerations for the future of microcredentials. Recalling the four research questions that underpinned this study:

- How are microcredentials defined by different sources, and what features do different sources attribute to microcredentials?
- What are the commonalities, and what are the debates?
- Are there different types of microcredentials, and how should they be defined?
- What are the challenges and opportunities associated with microcredentials?

Six future learning recognition transitions

Microcredentials have emerged as mechanisms to recognize the completion of short learning activities delivered in formal, non-formal or informal learning contexts. This growing attention from the international community has accelerated even further during and after the COVID-19 pandemic. The question at this point is whether microcredentials present a new phenomenon that may disrupt the learning and training as we know it. By drawing on all the available new research, complemented by analysis of four diverse thematic deep dives with a strong focus on LMICs — country/India, sector/health, company/Microsoft corporation, youth initiative/Yoma — it has been made clear that the development and recognition of human abilities are at the core of credentialling systems. It is also evident that microcredentials can codify abilities in a fine-grained manner that are particularly compatible with digital processes.

Microcredentials are changing the way we think about learning, but they should be seen as an artifact within this transition, not as an end in itself.

Terminology and concepts are constantly evolving. Digitalization and new technologies are contributing to this evolution. At the core of this evolution lies what the findings of this report have identified as **Future Learning Recognition Transitions**, which are presented at a meta-level in table 2. These transitions provide the framework wherein microcredentials should be interpreted. Microcredentials are changing the way we think about learning, but they should be seen as an artifact within this transition, not an end in itself. Stated differently, it is more important to recognize the overarching evolution, than to be fixated only on microcredentials within a process.

The learning recognition transitions below are listed in a logical, rather than alphabetical, order. Earlier use of a term is not better/worse than its emerging or future application, it simply indicates change over time.

Table 2. Future Learning Recognition Transitions

Source: Authors

Learning recognition transition	Established practice	Emerging considerations	Potential future application
Transition 1: Human abilities	Knowledge, skills, and competencies are widely used as domains that categorize human abilities.	The domains are expanded, and more emphasis is placed on understanding progression (scaffolding) within each domain. Digitalization of systems and processes also mean that analysis and matching can be done more algorithmically.	*Traits* that include distinguishing characteristics, such as knowledge, skills, and competencies, but also include professional status, citizenship, or financial security.
Transition 2: Types of learning	Classic OECD definitions of formal, non-formal and informal learning are used. Workplace learning is most often categorized as non-formal learning.	Processes like RPL have attempted to retrofit non-formal and informal learning into formal learning but have proven to be costly and difficult to scale. Workplace learning is increasingly recognized and compatible with provider-based learning.	*Credential fluency* is the increasingly seamless interrelationship between the recognition of formal, non-formal and informal lifelong learning made possible through a user-centric approach, digital forms of recognition, improved data interoperability, and closer alignment between learning and the world of work (UNESCO 202021b, 2022a)
Transition 3: Evidence of learning achievement	Paper-based certificates for formal learning are phased out and digital certificates become more prominent. Digital certificates are issued by a third-party certification authority, which can be government agencies or industry-based councils. Badges are mostly used in the context of non-formal learning.[36]	Digital certificates start to function in the same way as identification documents such as a driving licence. A digital certificate binds a digital signature to a particular person or people.[37] Badges become more digital and are used widely for industry certifications. Open badges are developed that are verifiable, portable, packed with information about skills and achievements, and issued, earned and managed by using a certified Open Badges Platform.[38] The labour market increasingly starts to place a value on badges and new forms of credentialling.	Digital identity is made possible through new technologies, including blockchain. Issues of ethics and human rights come into play as the ability to differentiate between people and machines is contested.39 The differences between verifiable credentials (VCs) and non-fungible tokens (NFTs) are recognized and implemented in a consistent manner.

36 For information on badges see Iafrate 2017 and Young et al. 2019.

37 UNESCO and COL 2022.

38 UNESCO and COL 2022.

39 UENSCO and COL 2022.

Learning recognition transition	Established practice	Emerging considerations	Potential future application
Transition 4: Representation of learning achievement	Qualifications have been used for centuries to denote formal learning achievement. Types of qualifications include diplomas and certificates, usually at lower levels. Vocational and academic streams tend to exist in parallel. Non-formal learning is represented through artifacts such as RPL to skills programmes, short courses, non-degree or non-credit-bearing courses. The nomencla-ture varies across countries and regions.	The traditional notion of a qualification is expanded through MOOCs, other online courses and industry certifica-tions. Digital credentials as a digital record of focused learning achievement verifying what the learner knows, understands or can do are used more widely.40 The separation between vocational, occupational and academic streams become less obvious.	A *credential* is the sovereign digital representation of recognized, achieved, attributed, and verified traits. Credentials reflect standards informed by industry practices. A microcredential is a building block of a credential.[41]
Transition 5: Verification of learning achievement	Quality assurance is used as an external measure of verification of learning achievement for formal learning. Non-formal and informal learning is not quality assured, and as such, often viewed as inferior to formal learning.	New forms of quality assurance emerge, including a differentiation between the quality assurance of the course content, delivery and certification. Online delivery and digital certifications challenge existing verification systems.	Verification can take place across at least three levels: self-verification; peer-verification; and independent verification (also referred to as the gold standard). Interoperable data platforms make it possible to conduct verifications at these different levels and the verification options make it easier for the labour market to value learning achievements from diverse origins.
Transition 6: Collation of learning	Formal learning components are credit based and are collated using credit accumulation and transfer systems. Non-formal and informal learning is more difficult to collate beyond a CV that is not fully verifiable.	Credit accumulation systems become more digitized, while qualifications and courses (also in workplaces) increasingly use learning outcomes.	*Stacking* of chunks of learning becomes more feasible through microcredentials, the use of digital representations, and verifications methods based on digital identities. Supply- and demand-side approaches to collating and valuing learning become more synchronized.

40 UNESCO 2022a.

41 Microcredentials can be stacked into credentials. Microcredentials are most often associated with the completion of a short training programme, but could also be components of other traits, such as professional status, citizenship, or financial surety. A macrocredential may consist of a stack of microcredentials or may exist as a credential in its own right. Macrocredentials are most often associated with the completion of more extended training programmes that included independent verifications, such as qualifications.

Key findings

Microcredentials may disrupt learning and training as we know it

Based on this literature review and the analysed thematic deep dives that make up this report, framed by a careful consideration of the research questions, this report finds that microcredentials may have started out as very similar to partial qualifications, drawing on MOOCs and SPOCs, but that there is more to consider. The COVID-19 pandemic accelerated the development of collective global technological architectures, and now makes it possible to think about smaller chunks of learning in ways not possible before (Chakroun and Keevy, forthcoming). The International Commission on the Futures of Education (UNESCO 2021a) is certainly of a similar view, in addition to emerging contemporary developments (ETF 2022; Goger et al. 2022). It seems that this transition has already started, even if many may not be ready to admit it.

The current risk is that the more agile and well-resourced private sector is claiming large chunks of new territory, while public systems, notably in LMICs, are slow in the transition. The private sector cannot be blamed for this, but the reality is that this trend will inevitably lead to deepened inequality across a globe that is already in turmoil due to developing climate and security uncertainties. The recently published UNESCO TVET Strategy 2022–2029 (UNESCO 2022a) provides a very timely reflection point, outlining the need to respond with an inclusive and proactive approach to six key dimensions towards the SDGs: i) economic recovery; ii) technological change; iii) informality; iv) demographic transition; v) societal and political issues; and vi) green and sustainable economic transition. Importantly, UNESCO's future vision includes building flexible learning pathways with microcredentials, signalling UNESCO's intention to assist in the development of a global framework for microcredentials (UNESCO 2022a, 15):

> Microcredentials, digital credentials and other alternative credential forms are increasingly offered by TVET providers, as well as industry and third sector partners. UNESCO will prepare an international quality framework for microcredentials, including an internationally agreed definition, standards for quality assurance, and principals for stacking and interoperability.

Taking this official intent by UNESCO into account, this research has identified five interrelated considerations that can assist developing and developed countries to benefit from microcredentials:

- Learning outcomes: The common currency
- Linking supply and demand: The value of microcredentials in the labour market
- Youth employment: Mixed evidence and unrealized potential of microcredentials
- Beyond qualifications frameworks: Learnings from interoperable data platforms
- New forms of governance and ownership: Digital identity and distribution

Learning outcomes:
The common currency

The global understanding and use of learning outcomes has grown steadily in the last two decades. Learning outcomes are now better understood and more consistently applied across qualifications and partial qualifications in the schooling, higher education and TVET sectors. Qualifications frameworks have assisted in this process, with more than two-thirds of the world's countries and regions now involved in one way or another in developing NQFs (ETF 2022). It could be argued that a more scientific approach to scaffolding learning outcomes could be developed, but overall, levels and domains of learning are well understood. New forms of assessment and digital modes of delivery have also steadily improved from the pioneering days of open learning and MOOCs.

Microcredentials can also be constructed using learning outcomes. In fact, microcredentials linked to qualifications and partial qualifications registered on NQFs will all be based on learning outcomes, whereas those linked to skills programmes or industry certifications may not. Some microcredentials also include new forms of assessment and digital delivery modes, while it cannot be disputed that classroom-based learning remains a common mode of delivery, also for microcredentials (CEDEFOP 2022b). Microcredentials are also unique in that they have, in the main, evolved from a demand-side perspective by filling in gaps that new jobs require in a quicker and more responsive manner than traditional qualifications have been able to do. This unique bridging characteristic is discussed further below.

Governments and qualifications agencies across the globe are clearly grappling with how to bring this new phenomenon into the formal system, resulting in calls to rethink education, training and the work continuum (Chakroun and Keevy, forthcoming). Others are claiming that microcredentials are not anything new, but simply new names for what has existed before (see Brown et al. 2021b). Some countries such as Malaysia, Malta, New Zealand, India, and Ireland are certainly trying to navigate this process very well, as has been elaborated in earlier sections.

The codification of learning through learning outcomes, contained in microcredentials using digital platforms, paves the way for the development and application of algorithms that can apply rules of combination in far more sophisticated ways than any conventional system would be able to.

There is also a need to exercise caution were risks need to be mitigated, including potential bias and discrimination when considering algorithms. Learning outcomes is the common currency that can make learning more fluent than any form of credit accumulation and transfer, or even an RPL process.

Linking supply and demand: The value of microcredentials in the labour market

The close alignment of microcredentials to the world of work has been discussed several times in this report. This demand-side perspective (proxied by employers) has been an ambition of the supply-side actors (proxied by education and training providers) but has very seldomly been realized (see Card et al. 2018). On the employer side, strong systems of employability, job gradings and, in more recent years, job profiling and matching have been developed. These systems have become more digital and agile, and just like the qualifications/credentials debate, the systems and platforms being developed have become strongly dominated by large private corporations that have had the resources to experiment and test cutting edge software to further strengthen their competitive advantage. Again, just like the microcredentials debates, this has inevitably resulted in deepened inequality across the globe.

The key consideration here is to draw on the experience with microcredentials, and the current momentum globally, and bring occupational systems closer to educational systems. New iterations of systems like the International Standard Classification of Occupations (ISCO), the European Skills, Competences, and Occupations (ESCO) and O*NET[42] can be brought into closer alignment with new developments related to qualifications frameworks. In fact, this is already happening in many parts of the world. A prime example is taking place in the context of ESCO through a pilot project and AI-based tool to link learning outcomes of qualifications with ESCO (occupations and skills).[43] Microcredentials have the potential for individuals and companies to search for adjustments on skills and skillsets, rather than only on qualification-based vacancies and job specifications. This requires that individuals themselves can signal their skills and can seek to develop them in a targeted fashion.

The development of interoperable data platforms based on common principles, such as learning outcomes and related taxonomies,provide the technological infrastructure through which all forms of learning can be codified.
In turn, this could allow for knowledge, skills and competencies to be analysed, collated and aggregated using algorithms which would far exceed human ability to link descriptions of supply and demand in education, training and work ecosystems.

42 More information on these systems is available at ISCO: https://isco-ilo.netlify.app/en/; ESCO: https://esco.ec.europa.eu/en ; and O*NET: https://www.onetonline.org/.

43 See more on ESCO's artificial intelligence activity at: https://esco.ec.europa.eu/en/about-esco/data-science-and-esco/leveraging-artificial-intelligence-maintain-esco-occupations-pillar.

A related consideration would be to start aligning global recognition instruments, such as the Lisbon,[44] Addis,[45] and other global Conventions on international labour standards. This includes the ILO's Conventions such as the Workers with Family Responsibilities Convention, 1981 (No. 156) on equality of opportunity and treatment, and the Discrimination (Employment and Occupation) Convention, 1958 (No. 111), among many others (ILO 2022a). Future facing developments, such as the World Reference Levels (UNESCO 2019), as well as improved understanding of the interrelationship between the status of migrants and skills recognition (ILO 2020; ILO and UNHCR, forthcoming), have already started to realize this possibility. It is also important to mention new international initiatives, such as the African Continental Qualifications Framework (ACQF)[46] referred to earlier in this report, which is at an advance stage of development with tools and policy documents and will be further supported with a qualifications platform. The ACQF implementation will include work on microcredentials and has already developed guidelines for innovation and technology (Shiohira et al. 2022).

Youth employment: Mixed evidence and unrealized potential of microcredentials

There is a mismatch between the appeal and promise of microcredentials to youth, and the likely benefit they may receive (Kässi and Lehdonvirta 2022). Microcredentials appear most beneficial to somewhat experienced workers and workers whose earnings are depressed by statistical discrimination, such as immigrants and minorities.

The anticipation around microcredentials from experts and from youth themselves is great. Microcredentials are seen as an artifact which can enable far greater access to many more types of learning than any education system has achieved before, reaching not only formal educational experiences but also those from the informal and non-formal sectors. This is creating a more complete portfolio of competencies which should more clearly signal to employers the aptitude necessary for a particular position. However, to date evidence does not suggest this vision is being achieved at scale. Youth and employers both indicated that a microcredential alone was insufficient for employment, even though respondents indicated that there is movement among employers away from requiring formal degrees for all positions (notably, the preferred alternative criteria were related work experience rather than alternative forms of training).

Study respondents indicated that microcredentials do not always result in employment for youth, but there are reported secondary benefits outside of being employed such as gaining increased digital knowledge. Microcredentials are currently mainly used by adults in employment, as continuing TVET and supplements to full qualifications (CEDEFOP 2022b). Youth who engage in short upskilling courses can however experience a wage increase and increased employment rates, and in some cases, can even out-earn the average wages of higher degree holders (Carnevale et al. 2018).

There is a mismatch between the appeal and promise of microcredentials to youth, and the likely benefit they may receive, which indicates the need for support in their utilisation.

44 Council of the European Union and UNESCO 1999.

45 UNESCO 2020.

46 See the ACQF website at: https://acqf.africa/.

The appeal of microcredentials to youth is important to note. The Yoma thematic deep dive showed that youth were of the view that microcredentials could enhance job security, employment, job creation, promotion opportunities and lateral movement – even if these expectations were not supported by evidence to date. Secondary benefits to youth, outside of being employed, are also important to note, including increased digital knowledge, and experience with social media marketing, data analytics and user experience (UX). Effective utilisation requires, however that young people know which microcredentials hold market value, and how to use and combine them to successfully access career pathways.

Beyond qualifications frameworks: Learnings from interoperable data platforms

A consideration for government, employers' and workers' organizations and development organizations is how to transition from existing qualifications systems, predicated on formal, non-formal and informal approaches, to incorporate the benefits of interoperable data platforms. These emerging platforms, many of which are discussed in the four thematic deep dives presented in this report, are premised on proprietary technologies, built, and sold repeatedly. There is an important opportunity to develop guidelines and standards that protect the vulnerable and make these technologies and related code available in open and free formats. The momentum of interest in microcredentials has mobilized significant international action and resources, which includes the need to develop guidelines, standards, and policies (ETF 2022). Social dialogue will be key to that end.

Existing qualifications frameworks could gain considerably by becoming more digital and more agile. Credit systems developed a few decades ago can be transformed into formats that allow for stacking and more automated forms of articulation. Smaller-sized partial qualifications can also be managed in a simpler manner if data systems are more interoperable. Critically, NQFs have the potential to evolve into frameworks that can accommodate different types of learning, new forms of evidence of earning achievements, new forms of verification, and provide the general public with more trustworthy representations of their learning achievements. All of this can also be done with enhanced adherence to data privacy laws.

A key challenge to these existing systems, and the organizations that oversee them, is the extent to which they can transition in a coordinated manner that avoids unnecessary disruption. The more decentralized models of governance, such as decentralized autonomous organizations, that are often associated with this transition may be a difficult hurdle to overcome and will likely take place within the systems they oversee — with or without them.

New forms of governance and ownership: Digital identity and distribution

The fourth and last consideration is built around data privacy and what it translates into when we think about credentials. This research has focused on microcredentials and has attempted to explore the topic from various angles as presented in this report, but credentials are linked to broader modalities. A driver's licence is also a credential, so too a passport, a vaccination certificate, or even an online banking profile. There are also licences to practice, such as required by doctors, lawyers, teachers, and many other professions that could be classified as credentials. If all these credentials are digital and governed through the same standards and technologies, they become more integrated, even seamless.

At the centre of the concept of credentials is the unique human biological identity — an identity that can also be unique in the digital domain. This digital identity requires new forms of protection and ownership which has been made possible by blockchain-based technologies such as self-sovereign identity (SSI). A fundamental feature of this digital identity is that it is sovereign. It is owned and managed by the human to which it belongs — not the employer, university, licensing body, medical institution, or even bank.

Closely related to digital identity is the governance of digital platforms that enables the possibilities outlined above. These technology platforms

could have multiple owners depending on the territories in which they reside. A reality that may be difficult to face is that no single entity, be it a government, a private institution, or any combination of earlier mentioned examples, would be competent to govern on its own. New forms of public–private partnerships that involve citizens and civil society are showing great potential (West and Beukes 2021), more so when combined with distributed governance models such as decentralized autonomous organizations (Dale-Jones, forthcoming). It may still be too early to realistically consider how these governance models will evolve, but it is possible that they could be more closely aligned to international standards and frameworks.

Data-rich digital learning credentials, such as those being developed through the European Digital Credentials for Learning Infrastructure,[47] provide a firm foundation for semantic interoperability across European countries. The work of the Groningen Declaration Network (GDN)[48] is also important in this regard. Several LMICs have also made progress in developing digital identity infrastructure in areas of finance and citizenship. The challenge at present is to expand these developments into education institutions and workplaces.

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47 More information on the European Digital Credentials for Learning Infrastructure is available at: https://www.eqar.eu/qa-results/synergies/european-digital-credentials-for-learning/.

48 See the Groningen Declaration Network at: https://www.groningendeclaration.org/.

Policy recommendations

As research for this report was being finalized, the international community's interest in microcredentials was increasing. Several international studies were under way, several new studies were proposed, and an increasing number of countries and regional blocs were grappling with the impact that this phenomenon is having on their systems. At one extreme there are strong advocates arguing that microcredentials will change learning as we have known it for many decades, if not centuries – sometimes referring to a "non-zero-sum game" (Ha et al. 2022). On the other extreme, some policymakers and researchers argue strongly that microcredentials simply represent a new "craze" (Ralston 2021) that could disrupt pedagogical integrity and the functioning of well-developed quality assurance systems.

For those that have been working in the education and skills sector for many years, the new "disruption" associated with microcredentials provides a sense of déjà vu. The transition to qualifications frameworks, that in essence shifted much of the power to providers of education and training in the late 1980s was very similar, but it was slower and more measured. The current disruption is fast-paced, more disruptive, and is a definite shift of power towards employers. In fact, the shift is so pronounced through the technological undercarriage it is built on, that current systems will have to adapt very quickly or become obsolete in the next five to ten years.

For the individual (citizen, student, user, lifelong learner, employee, or entrepreneur), microcredentials act like a wedge, opening new thinking about human abilities, and how these abilities can be recognized, represented, and verified. Underlying this shift is a strong momentum towards personal data ownership and distributed governance models.

To move these debates forward for the benefit of the global community and accompanied by a strong awareness of the need to prioritize equality and sustainability programmes, the following recommendations are proposed.

Recommendation 1:
Enable reforms of qualification systems and frameworks to progressively accommodate quality microcredentials

Well-designed microcredentials reflect both industry practices and standards as well as the learning outcomes that should inform qualifications. Linking microcredentials to qualification systems will enable them to be stacked and combined, providing flexible pathways into partial and full qualifications. Examples of such microcredentials include modularised courses in higher education and TVET, whose granularity helps to recognize and validate skills and competencies in a flexible way, supplementing and/or replacing more traditional forms of credentialing.

Recommendation 2:
Provide quality assurance for microcredentials and raise awareness about their value

Microcredentials can advance learning and ensure access to skills and qualifications if relevant agents have trust in them. Quality assurance systems and awareness-raising campaigns should inform enterprises and individuals about the potential and value of microcredentials in upskilling and re-skilling processes. As in the case of TVET or apprenticeships systems, it is important for this process to reflect the collaboration between governments, training providers, and employers' and workers' organizations.

Recommendation 3:
Develop normative standards for microcredentials

The integration of quality assurance calls for standards that at national, regional, or international level recognize and balance the needs of the labour supply and demand, build on the characteristics and regulations of skills development and training systems, and leverage the experience and voices of governments, employers' and workers' organizations, civil society, and young people. UNESCO has indicated its willingness to engage in such a process (UNESCO 2022a, 2022b, 2022c, 2023). Ongoing work by international organizations on frameworks for transferable skills (UNICEF 2019) and core skills for life and work (ILO 2021b) provide good reference points. Perhaps the existing

UNESCO-UNEVOC *Inter-Agency Group on TVET*[49] provides a good platform to launch and manage such a far-reaching process, while the GDN can offer strong support that is not geographically biased.

Recommendation 4:
Provide career development services and support to improve microcredentials' uptake

Individuals of all ages require support in integrating microcredentials in personal career strategies. The availability of career development services and awareness of career practitioners about microcredentials is therefore key to their uptake, securing a clear understanding about their benefits. Career development services can go a long way in ensuring the identification of career paths, clarity on the skills and competences demanded by the labour market, the acquisition of both technical and core skills, and additional supporting strategies to facilitate the transition to jobs. Financial support may be also key to facilitate access to microcredentials, especially among those most vulnerable in the labour market such as women and youth.

Recommendation 5:
Develop enabling digital ecosystems for microcredentials, within an ethical framework

Interoperable platforms that link individual career development processes, certification systems and individual incentives, facilitate the role that microcredentials can play in fostering access to quality, demand-driven skills and qualifications. These platforms allow for ownership and efficient recognition and exchange of information regarding skills, which in turn helps with hiring processes, staff development, and planning. Investing in such platforms, their ethical frameworks, and the technologies that enable the development, delivery, validation, and safe storage of microcredentials is strategic yet costly and complex. It is important to leverage the lessons learned from countries and regional blocs where such platforms have been developed and explore innovative tech-based solutions, such as blockchain, ensuring a secure and ethical treatment of data.

Recommendation 6:
Develop new forms of governance for credentialling platforms

The growing development of credentialling platforms invites a review of the governance and oversight of credentials at national level. While some governments are testing decentralized and more autonomous governance models, these developments are isolated and take place mostly in developed countries. Further consideration must be given to participatory, ethical and self-sovereign approaches built on the identity of citizens, including youth.

Recommendation 7:
More empirical evidence on the impact of microcredentials on labour market outcomes will create positive feedback loops in their design and implementation

As the use of microcredentials expands, it is important to integrate metrics of success to trace their impact on intended outcomes, from the quality of skills recognition mechanisms to the transition of users into employment and decent work.

This research has been specific in its focus and scope, and inevitably has not been able to cover every aspect linked to microcredentials. The current research now provides an important point of refence for future and ongoing studies, many of which were already under way as this report was being finalized.

49 UNESCO-UNEVOC publishes newsletters on the activities of the Inter-Agency Group on TVET. See their website at https://unevoc.unesco.org/home/UNEVOC+Publications/lang=en/akt=detail/.

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