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# Micro-Credentials: An Evolving Ecosystem

—  
Insights paper

AUGUST 2020



## FOREWORD

This Insights Paper is part of a wider feasibility study considering the development of a framework for the recognition of micro-credentials in industry. It follows and builds upon an initial study undertaken by Skillnet Ireland in 2018/2019, which explored the potential of digital badging as a form of micro-credentials in the agri-food sector. This paper concludes that the use of micro-credentials are of yet not widespread. Internationally, however, they are viewed as an emerging solution to the huge demand from all sectors for upskilling and reskilling to meet the needs of the evolving workplace. Five Skillnet Networks in collaboration with the National Institute for Digital Learning in Dublin City University are carrying out further research to investigate the opportunity and potential of micro-credentials in the wider workforce and to consider international developments and trends in this space.

### **This paper can be cited as:**

Beirne, E., Nic Giolla Mhichíl, M., & Brown, M. (2020). Micro-credentials: An Evolving Ecosystem. Dublin City University.

### **Acknowledgements:**

This paper has been commissioned by a consortium of five Skillnet partners:

- Aviation Skillnet: [www.icbe.ie](http://www.icbe.ie)
- ICBE Advanced Productivity Skillnet: [www.icbe.ie](http://www.icbe.ie)
- ICBE Business Excellence Skillnet: [www.icbe.ie](http://www.icbe.ie)
- Galway Executive Skillnet: [www.galwayexecutiveskillnet.com](http://www.galwayexecutiveskillnet.com)
- Taste4Success Skillnet: [taste4success.ie](http://taste4success.ie)

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## INTRODUCTION

This insights paper provides an overview of the burgeoning field of micro-credentials and their relevance to industry. Micro-credentials are as the term indicates, units of learning which are significantly smaller than traditional forms of accredited learning such as diplomas and under- or postgraduate degrees. These units of learning are seen to provide focused learning opportunities for learners and are particularly concentrated on the development of skills and competencies aligned with upskilling and reskilling of employees to embrace the changing nature of work within and across sectors.

Micro-credentials are also seen to address demands of employers and employees by providing:

- Short lead in times to certification
- Address work/life balance issues
- Course financing
- Skill provision in new and emerging areas within sectors and society

As such, the micro-credential movement is gaining momentum across the world. The recent coronavirus pandemic has accelerated the level of interest in short programs of learning linked to addressing specific skills gaps.

This paper provides a helicopter view of the micro-credential landscape (Summer 2020), precluding the first national empirical study of micro-credentials among employers and employees in Ireland, which is being conducted by the National Institute of Digital Learning, Dublin City University in tandem with a consortium of five Skillnet networks: Aviation Skillnet, ICBE Advanced Productivity Skillnet, ICBE Business Excellence Skillnet, Galway Executive Skillnet, and Taste4Success Skillnet. This paper outlines the contextual background for this study and is not intended to be a comprehensive and detailed analysis of the field.

Four questions form the basis of this paper:

1. What are micro-credentials?
2. Why micro-credentials?
3. Who are the stakeholders?
4. What is happening globally?

Conclusions of the paper centre on 5 key takeaways:

- Field is nascent but evolving.
- The position of micro-credentials in the credential ecology is not yet explicit.
- All stakeholders need to be involved in the development of the field.
- The micro-credential ecosystem is diverse but disjointed.
- The National Framework of Qualifications (NFQ) gives Ireland a unique advantage in the adoption of micro-credentials.

## WHAT ARE MICRO-CREDENTIALS?

No consensus exists on the term 'micro-credential'. In addition, a wide range of other terms are commonly used synonymously or in association with the term. These include: digital badges, alternative credentials, digital credentials, nanodegrees, digital certificates, micromasters, and even, short online courses.

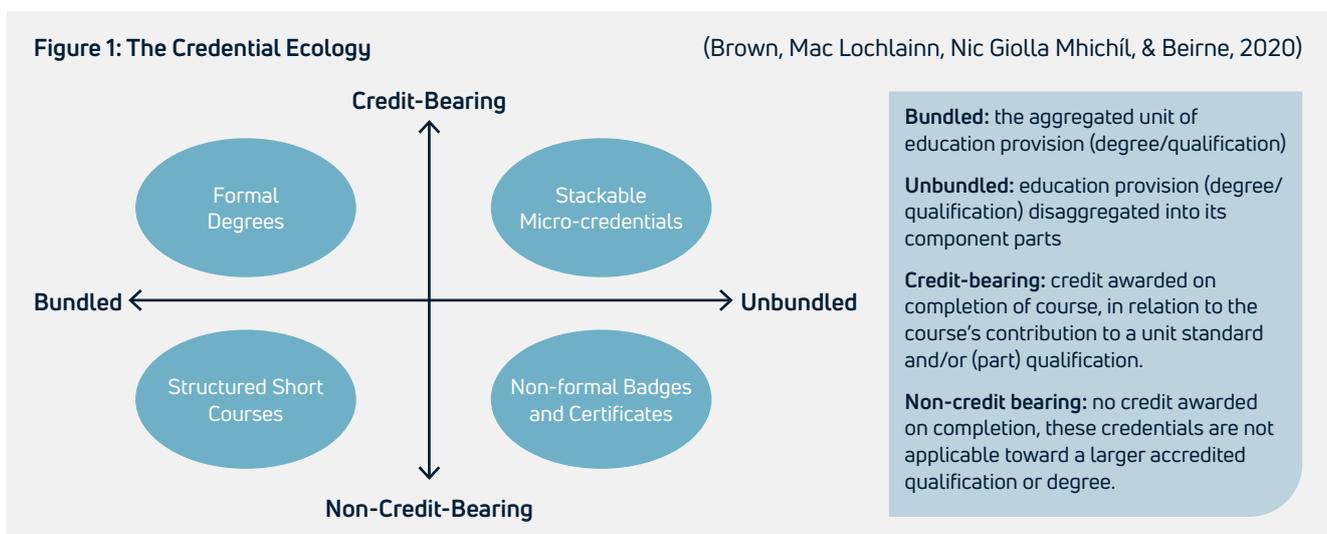
### Defining Micro-credentials

Internationally the definition of micro-credentials varies significantly. As a result, the term 'micro-credential' has been used to describe all manner of shorter-forms of learning experiences irrespective of type, mode and size. For example, Pickard, Shah and De Simone (2018) widely define a micro-credential as "any credential that covers more than a single course but is less than a full degree". Oliver (2019, p.1) from Deakin University in Australia, proposes the definition of a "certification of assessed learning that is additional, alternate, complementary to, or a formal component of a formal qualification". Oliver (ibid) places an emphasis on verified learning outcomes and a micro-credential's relation to traditional formal qualifications such as a bachelor's or master's degree. An emerging definition of micro-credentials from a European project, MicroHE, is where a micro-credential is viewed as "sub-unit of a credential or credentials that confer a minimum of 5 ECTS, and could accumulate into a larger credential or be part of a portfolio" (MicroHE Consortium, 2020). This definition begins to narrow down the criteria for a micro-credential in terms of workload (ECTS). The New Zealand Qualifications Authority (NZQA) go further and bound a lower and upper-limit, defining micro-credentials as 5 - 40 credits in size (New Zealand Qualifications Authority, 2019).

Attempts at reaching an agreed definition are complicated further by the use of contradictory typologies and synonyms. A frequent point of contention is the relationship between the terms 'micro-credential' and 'digital badge'. As Sturgis (2019) states "the difference between micro-credentials and badges...was becoming less and less clear ... Not that it was ever that clear in the first place". The term 'micro-credential' has also become synonymous with certificates of assessed learning earned through MOOC<sup>1</sup> structures, but many MOOC platform providers use their own labels: MicroMasters (edX), Nanodegree (Udacity) and Specialisation (Coursera).

A UNESCO report identifies the term 'micro-credential' as an umbrella term that "encompasses various forms of credential, including 'nano-degrees', 'micro-masters credentials', 'certificates', 'badges', 'licences' and 'endorsements'" (UNESCO, 2018). On the other hand, The International Council for Open and Distance Education (ICDE) and the Organisation for Economic Co-operation and Development (OECD) have both adopted variants of the term 'alternative credentials', which encompasses but also differentiates between academic certificates, professional certificates, digital badges and micro-credentials (Kato, Galán-Muros, & Weko, 2020; ICDE, 2019).

In an attempt to reconcile the field, Brown, Mac Lochlainn, Nic Giolla Mhichíl and Beirne(2020) outline a credential ecology (see Figure 1), which differentiates between credit-bearing and non-credit-bearing credentials, and credentials that are bundled and unbundled.



<sup>1</sup> MOOC (Massive Open Online Course) – Short non-accredited courses normally developed and delivered by Higher Education Institutes via platforms

According to this typology, micro-credentials are differentiated from traditional degrees, digital badges or shorter courses as unbundled, credit-bearing credentials. However, while this diagram is a useful aid in visualising the landscape, the distinction between quadrants is not always as clear cut in reality. For instance, an individual could have a non-credit-bearing badge in project management. This badge could be assessed as recognition of prior learning by an institution and contribute to a micro-credential.

The varying definitions and synonyms that exist for the term 'micro-credential' has created some confusion and a lack of understanding and awareness by institutions and potential employers and employees. A recent study, which interviewed key micro-credential stakeholders (students, educational institutions, governments and employers) across Europe, found that the majority of those interviewed did not know what the term meant (Micro-HE Consortium, 2019b). Another group of interviews conducted by Resei, Friedl, Staubitz and Rohloff (2019) also found that employers and even universities (directors and strategy planners) were unaware of the term resulting in a low awareness of the value associated with this new type of credential. Agreeing on what is meant by the term 'micro-credential' is essential to establish standards, compare best practices, and ensure recognition and mobility for credential bearers and issuers.

A European Commission Consultation Group actively working to address this problem have produced the following working definition:

A micro-credential is a documented statement awarded by a trusted body to signify that a learner upon assessment has achieved learning outcomes of a small volume of learning against given standards and in compliance with agreed quality assurance principles. Micro-credentials express credit volume and they are referenced to the national qualification framework and the EQF. A micro-credential may be offered independent of the method of provision (face-to-face, online or blended learning) or the nature of learning (formal, non-formal, informal). Micro-credentials are owned by the learner and are sharable and portable in the format of a stand-alone certificate, a digital badge, or as part of a portfolio.

Furthermore, Ireland has been singled out as one of the only countries in Europe to have an existing mechanism for recognising micro-credentials. The National Framework of Qualifications (NFQ) in Ireland already accommodates special purpose awards (see Appendix A), which are a pathway into the NFQ for micro-credentials.

### A Google Trends Analysis

The term 'micro-credential' first appeared in Google search results in 2013. The term is most searched in Australia but also appears among search queries in the United States. Currently, there is not enough search queries from other countries to report any trends. Table 1 compares the global Google Trends results for the term 'micro-credential' and its variants.

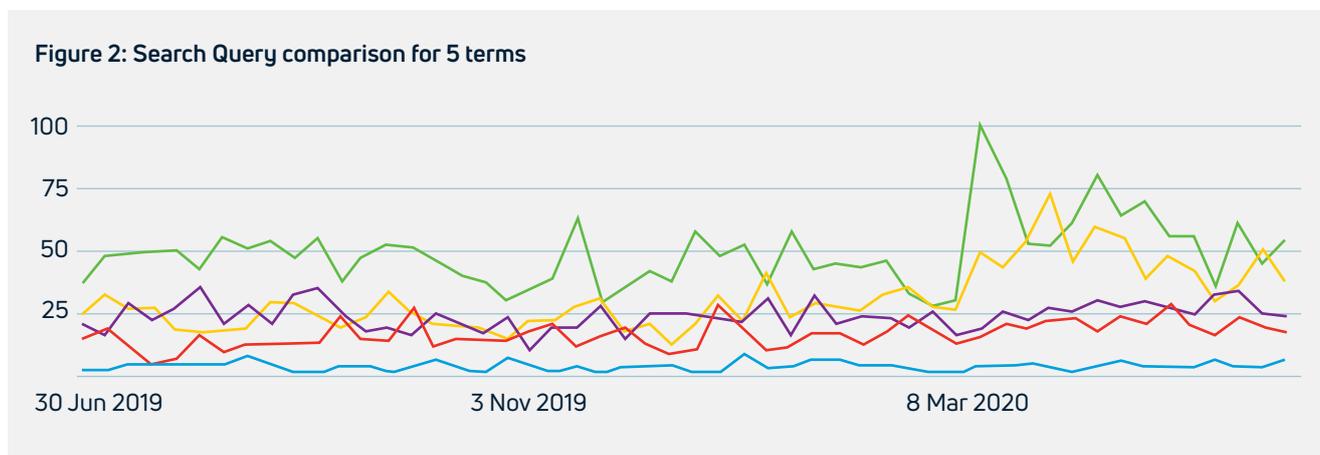
The results of this comparison show that many of the terms were in use over 15 years ago. This finding echoes Oliver's (2019, p. i) assertion that the concept is not a new one, "for decades, extension courses have enabled further education, community engagement and lifelong learning".

The search queries related to each term demonstrate that terms can be linked to the platform that provides this type of micro-credential (e.g. micromasters edX), or a specific course, which uses the term in its title (e.g. android basics nanodegree program). Notably, the digital badges provided by IBM appear as a popular search query related to the term 'digital badge'.

Table 1: Google Trends Comparison

Term	First Appeared	Top 5 Search Locations	Recent Related Queries
Microcredential	2013	Australia United States	No data available
Digital Badge	Before 2004	United Kingdom United States Australia India Canada	digital technology merit badge digital technology, blue badge what is a digital badge IBM digital badge
Short Online Course	Before 2004	South Africa, Australia Pakistan United Arab Emirates Philippines	free online courses online business courses uniza short courses interior design course open university coursera
Nanodegree	2006, popularised 2014	Egypt Singapore St. Helena Nigeria India	udacity udacity nanodegree data nanodegree nanodegree adroid nanodegree review
Micromasters	Before 2004	Singapore United Arab Emirates Pakistan United States Australia	Micromasters MIT edX micromasters edX micromasters program
Alternative Credential	2004	United States	No data available
Digital Credential	Before 2004	United States India	Digital Badge

A comparison of search interest worldwide for five of the terms (micro-credential [blue], nanodegree [green], micromasters [purple], digital badge [red], short online course [yellow]) between June 2019 and June 2020 is also presented in Figure 2. The graph represents search interest for each term relative to the highest point on the chart for the given time period. There are notable spikes in interest in March and April 2020 which coincide with the outbreak of COVID19 across the world. It is also interesting to note that 'nanodegree' is the term that has attracted most Google search interest over the past year.



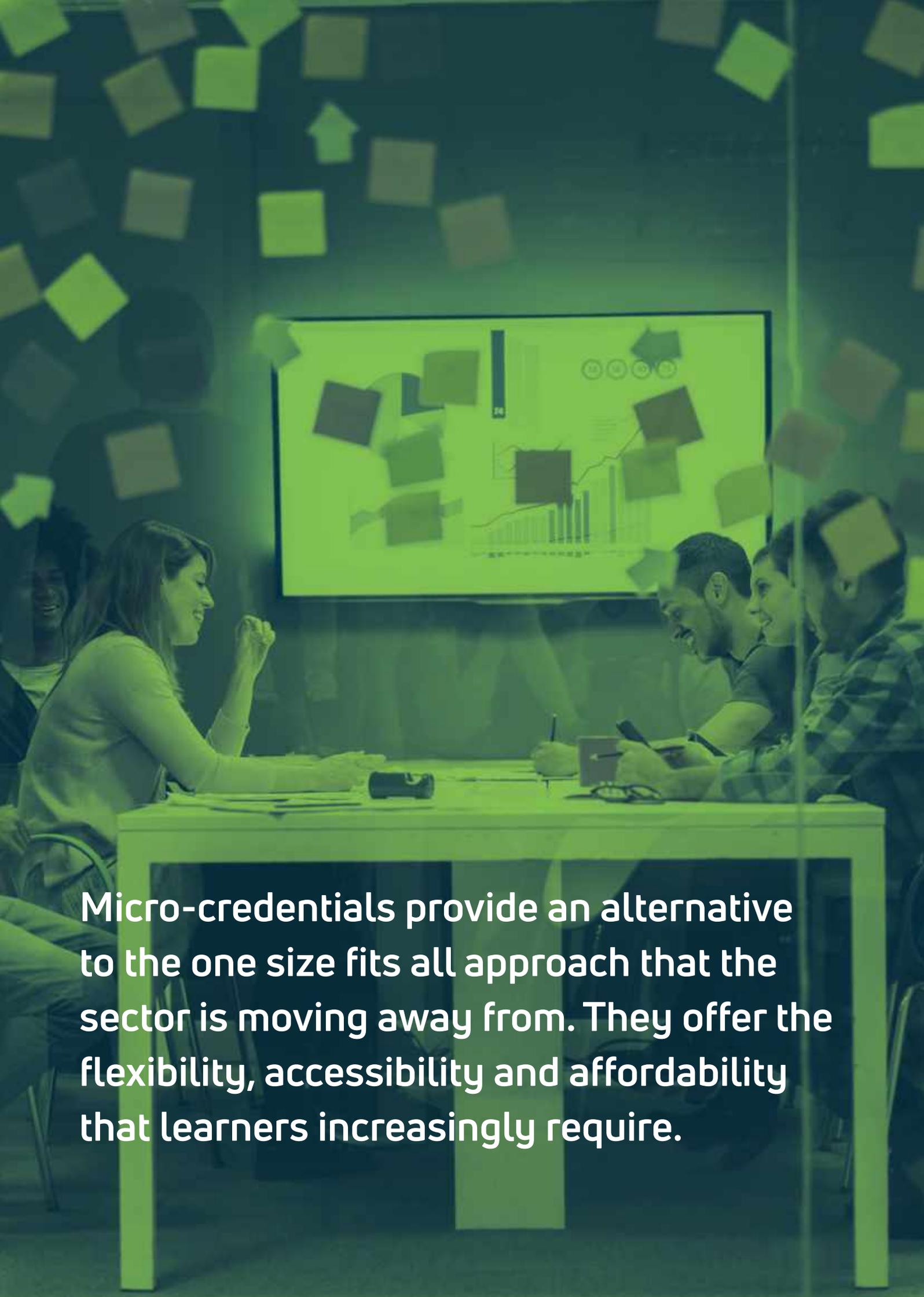
## WHY MICRO-CREDENTIALS?

The changing world of work has been highly publicized. Globalisation, aging and technological advancements, such as artificial intelligence and robotics, promise great benefits and new job opportunities, but also bring with them risks of displacement and the need for re-skilling among workers (Manyika et al, 2017; Deloitte Insights, 2019; OECD 2020). Figures from a 2017 report published by the McKinsey Global Institute indicate that by 2030, 75 million to 375 million workers (3 to 14 percent of the global workforce) will need to switch occupational categories (Manyika et al, 2017). As the skill demands continue to change, it is posited that people will continually need to re-train, re-skill or redeploy to avoid irrelevancy.



More and new types of education will be needed to facilitate reskilling and up-skilling. Traditional educational degrees, which are being increasingly criticised for their lack of alignment with employment needs and inability to adapt in a timely manner to changing trends, are not the answer. People need flexible, personalised and on-demand life-long and life-wide learning options that will equip them with both the cognitive and emotional skills and knowledge to adapt to life and work in the digital world (OECD, 2019). Ultimately, over and above closing skills gaps and embracing new business models, there is a general understanding that society will benefit from investments in life-long learning.

Demand for alternative forms of education is already increasing. Personalised learning, micro learning and high-velocity training were amongst the key global education trends identified by Euromonitor (2017). It is also noteworthy that there were over 110 million learners enrolled in over 13,500 Massive Open Online Courses (MOOCs) throughout the world by the end of 2019 (See Figure 3; Shah, 2019). Characterised as flexible, open, self-paced, highly interactive, interdisciplinary and cost-reducing, MOOCs are becoming increasingly established in both higher education and industry. In addition, the on-going pandemic has seen dramatic increases in MOOC engagement. MOOCs have attracted almost 500 million visits from learners around the world in the last 30 days (HolonIQ, 2020). Class Central have also reported that the numbers of sessions on the major MOOC platforms during March and April are up 50% to 400% on previous years (Shah, 2020a). More and more learners are looking for alternative education solutions amid a rapidly-evolving work landscape.



**Micro-credentials provide an alternative to the one size fits all approach that the sector is moving away from. They offer the flexibility, accessibility and affordability that learners increasingly require.**

## WHO ARE THE STAKEHOLDERS?

**Table 2: Key Micro-credential Stakeholders**

Group	What's at Stake?
Learners	Personal success, future opportunity
Educators	Professional efficacy
Employers	Signalling of graduate/ employee skills and training

Key parties with an invested interest in the success of micro-credentials include: the learner, the employer and the educator (see Table 2). Micro-credentials hold benefits for each of these stakeholders (see Table 3). Providers and quality assurance agencies, including government and professional bodies, are other notable stakeholders.

### Stakeholder Perspectives

A European study that interviewed different micro-credential stakeholders (learners, employers, regulators and higher education institutions (HEIs)) found each group had differing priorities and expectations (MicroHE Consortium, 2019). Learners wanted short, effective, up-to-date courses and viewed recognition as an added bonus, whilst employers called for clarity in terms of the competencies gained and valued courses that addressed specific skills. In addition, HEIs expect micro-credentials to be less bureaucratic and place an emphasis on accreditation for building trust (MicroHE Consortium, 2019).

Limited research into the employer perspective has been carried out. Nevertheless, the findings indicate that employer awareness and experience with micro-credentials is low. A study of 750 human resources executives in the United States shows that only a small share of the respondents reported hiring an individual with digital badges (14%) or micro-credentials (around 10%; Gallagher, 2018). However, 55% of the respondents agreed that micro-credentials were “likely to diminish the emphasis on degrees in hiring over the next 5-10 years” (Gallagher, 2018, p. 14). Similarly, in a study among recruiters in Ireland in 2018, 74% of respondents stated that digital badges were not important in the recruitment process but at the same time 55% put digital badges at the top of their list of topics of interest, indicating that they want to learn more about them (QQI, 2019). Another Irish-based study by the Food Industry Training Unit, University College Cork (UCC), focusing specifically on the Irish Food Sector, found that 70% of the employers interviewed admitted that they found it difficult to assess how a digital badge could be of benefit to the business but attributed this to their lack of knowledge and experience with digital badges. (Corrigan-Matthews & Troy, 2019). The same study also surveyed trainees, who had earned a digital badge. The majority (96%) indicated that they would be happy to display a digital badge on their online profiles and over 80% believed that earning a digital badge would be useful or very useful to them in the future (Corrigan-Matthews & Troy, 2019).

**More research to understand all stakeholder perspectives is needed to provide clarity and greater understanding as the field evolves. The national survey of employers and employees on micro-credentials will provide baseline data for Ireland on employer and employee perceptions on and experience with micro-credentials.**

**Table 3: Benefits associated with micro-credentials for each stakeholder** (Adapted from Resei, Friedl, Staubitz, & Rohloff, 2019)

Learner/ Employee	Employer/ Company	Educator/University
<ul style="list-style-type: none"> <li>• New possibilities for re-skilling and up-skilling</li> <li>• Lower costs</li> <li>• Flexibility</li> <li>• Personalisation</li> <li>• Global content</li> <li>• Demonstrate granular Competence (CV)</li> </ul>	<ul style="list-style-type: none"> <li>• New CPD option</li> <li>• Assist recruitment</li> <li>• Address widening skills gaps</li> <li>• Scalability</li> <li>• Improve collaboration with universities</li> <li>• Improve retention</li> </ul>	<ul style="list-style-type: none"> <li>• New business model</li> <li>• Improved collaboration with industry</li> <li>• Wider audience</li> <li>• Experimentation opportunities</li> <li>• Marketing tool</li> <li>• Improve quality (learner analytics)</li> </ul>

## WHAT'S HAPPENING GLOBALLY?

### Recent Announcements

Micro-credential projects and initiatives are gaining momentum across the globe. Table 4 summarises some of the major developments announced by different countries over the past year (2019 - 2020). Developments in Australia, Canada, and the Netherlands, in particular, indicate a move toward adopting uniform national approaches to micro-credentialing, and the supra-national body, the European Union, is following at pace in this direction.

**Table 4: Breakdown of projects and initiatives by country**

	<p>On the 22nd June 2020, the Australian Government announced its plans to build a \$4.3 million online micro-credentials platform in response to recommendations resulting from a review of the Australian Qualifications Framework published in 2019 (Department of Education, 2020).</p>
	<p>The New Zealand Qualifications Authority (NZQA) conducted 3 micro-credential pilots in July 2017 – June 2018 with Udacity, Otago Polytechnic and Young Enterprise Scheme. As a result of these pilots, the NZQA has now released a micro-credential system that aligns with their national Qualification Framework. This initiative, however, does not have university backing (Hipkins, 2018).</p> <p>In 2019, The New Zealand Tertiary Education Commission also introduced a public funding system for micro-credentials which means that all New Zealand Higher Education Institutions are eligible to apply for the micro-credential funding that will help them deliver micro-credential programmes (Tertiary Education Commission, 2019).</p>
	<p>On 16th June 2020, the Association of the Registrars of the Universities and Colleges of Canada (ARUCC), which serves 273 Universities and Colleges in Canada as well as number of provincial data exchange hubs, provincial governments and credential evaluators, announced that it was partnering with Digitary, as the digital credentials platform provider of choice for its national network. Once operational over 3 million learners across Canada will be able to access and share their official digital credentials online via Digitary (ARUCC, 2020).</p>
	<p>It is difficult to provide a succinct summary of micro-credential projects and initiatives in North America as accreditation is largely state-based. However, according to a report by non-profit, Digital Promise, more than 10 state education agencies are running official pilot programs for micro-credentials, with 5 more trialling micro-credentials in some form (Berry &amp; Byrd, 2019).</p>
	<p>On 1st July 2020, the European Commission launched the 'New Skills Agenda for Europe', which contains 12 pillars with one devoted to the importance of micro-credentials. A second pillar was devoted to a new EuroPass platform. Europass is an online framework of tools and information to help EU citizens communicate their skills, experience and qualifications with employers. Incorporated in this framework are software and services for education and training institutions to issue digital credentials (European Commission, 2020).</p> <p>The European MOOC Consortium, consisting of the main European MOOC platforms, FutureLearn, France Université Numérique (FUN), OpenupED, Miriadax and EduOpen, announced a Common Microcredential Framework in May 2019 (European MOOC Consortium, 2019).</p> <p><b>European Projects:</b></p> <p>MicroHE is an Erasmus+ project, which plans to measure the current state and trends, develop models for future impacts of micro-credentials, propose instruments (such as credit supplement) for transparency of credentials and build a prototype for a European credential repository (MicroHE Consortium, 2020).</p> <p>OEPass is a project that aims to improve the recognition and portability of open learning by developing a 'learning passport' that will provide a common standard across universities for describing these learning experiences in terms of ECTS (OEPass, 2020).</p>
	<p>In the Netherlands, SURF is developing an infrastructure through which Dutch educational institutions can issue digital certificates, called edubadges. The platform is due to launch before the end of the year (SURF, 2020).</p>

### Industry Initiatives

Industry and large international technology companies in particular, have already started to embrace badging systems for internal professional development.



IBM offers badges to both their staff and the wider public through their partnership with Coursera. They also established a partnership with North Western University so that IBM badges can be used towards professional master's degree programs at the university.



Google launched an Online IT support certificate in 2018 through Coursera and they created a consortium of more than 20 employers who are interested in hiring completers. Duke University also plans to offer credit for the course as part of a specialisation in Coursera.



Amazon made the decision in 2019 to spend \$700million dollars to retrain 100,000 of its employees outside the traditional education system using its training and credential programs.



The EY badging system, launched in 2017, offers staff the opportunity to up-skill by earning a badge in areas such as data visualization, AI, data transformation and information strategy. The badges are hosted by a third-party platform, Acclaim by Credly.



CISCO also uses the Acclaim platform to offer badges to its employees.



Siemens launched their own unique STEM skills programme with digital badges for children and teenagers



Microsoft awards both professional certificates and digital badges to individuals who successfully pass their examinations.



The Law Society of Ireland has developed a dedicated learning management system, Diploma Hub, to offer online and blended learning diploma and certificate courses to individuals in the solicitor profession. They have also developed a suite of MOOCs, which are open to anyone, anywhere for free, but can also be used by solicitors to fulfil CPD requirements.

Table 5: MOOC-based Micro-credentials

(Pickard, Shah, & De Simone, 2018)

Microcredential Type	Price	Months	Lowest Minimum Effort /Week	Highest Maximum Effort Per Week
Coursera Specialization	\$27- \$636	1-15	1 hour	40 hours
Coursera MasterTrack	\$2,000 – \$3,474	4-6	4 hours	15 hours
Coursera Professional Certificate	\$406 – \$5,980	4-8	8 hours	10 hours
edX XSeries	\$90 – \$594	2-10	1 hour	10 hours
edX MicroMasters	\$536 – \$1,500	3-15	2 hours	20 hours
edX Professional Certificate	\$68 – \$2,340	1-15	1 hour	13 hours
FutureLearn Program	\$147 – \$1,685	2-12	2 hours	6 hours
FutureLearn Graduate Certificate	\$6,406 – \$11,613	6-12	Not given	Not given
FutureLearn Graduate Diploma	\$15,320 – \$19,689	12	Not given	Not given
Kadenze Program	\$300 – \$900	2-7	6 hours	12 hours
Udacity Nanodegree	\$199 – \$2,400	1-8	5 hours	15 hours

Micro-credentials are not restricted to online methods of provision. To date, however, universities are predominantly hosting their micro-credentials on MOOC platforms.

Taking a closer look at MOOC-based micro-credentials, Pickard, Shah, and De Simone (2018) published an analysis of 450 micro-credentials offered on five MOOC platforms (Coursera, edX, Udacity, FutureLearn and Kadenze; see Table 5). They concluded that the micro-credential offerings lacked consistency and standardization, pointing out that there was as much variability within each type of micro-credential as across different types. These inconsistencies make it difficult for both employers and learners to evaluate the significance of a micro-credential offering and compare them; “while 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” (Pickard, 2018).

An analysis by Class Central has also revealed that by the end of 2019, there were over 800 MOOC-based micro-credentials and that 73% were from the field of business and technology (Shah 2020).

Moving forward, MOOC providers have indicated that they are actively seeking to develop out micro-credentials in the following areas:

- Data Analytics
- Social Media
- Business Strategy
- Financial Reporting
- Artificial Intelligence

### **Digital Solutions**

Existing digital credential platforms that could be used for managing micro-credentials include:

- Digitary
- Credentify
- Badgr
- DiploMe
- Open Badge Factory
- Badge Factor
- Badge Collect
- Accredible
- Digital Promise
- Acclaim by Credly

**In spite of the lack of definition, there is substantial activity in the field. Governments and international organisations are making future-focused decisions demonstrating their commitment to micro-credentials and the new model of learning they represent.**

## KEY TAKEAWAYS

This insights paper has provided a snapshot of the micro-credential landscape. This section highlights the five main takeaways from the paper.

1. The field of micro-credentials is nascent at both national and international level, but work that is being carried out by the European Commission will help to advance and facilitate structure. Emerging from the European conversation is the acknowledgement that assessment is the key principle in ensuring trust, recognition and quality assurance.
2. Contemporary developments in the field lean towards differentiating between micro-credentials that are formal and non-formal (i.e. whether they are related to part of an accredited training programme) but this dichotomy is not entirely clear cut.
3. There is a requirement to consider all stakeholder perspectives in the shaping and development of the field but there is currently a dearth of studies focused on perspectives of industries and employees. The limited number of studies that have been conducted show that valuable contributions are restricted by a lack knowledge and awareness. Employer and employee education is an important next step. In this respect, engaging with a micro-credential survey can, in itself, be an educative and an awareness building exercise.
4. At present the micro-credential landscape is diverse with many actors working independently of each other. A common and unified micro-credential ecosystem is necessary to address issues of portability, currency, consistency and coherency.
5. Finally, moving forward it is important to remember that Ireland is uniquely positioned to adopt and recognise micro-credentials via the special purpose award detailed in the NFAQ. This is not the case for the majority of other European countries. However, more work is required to answer the question of how should Ireland respond to the global micro-credentialing movement to address important skills gaps and promote lifelong learning more generally?

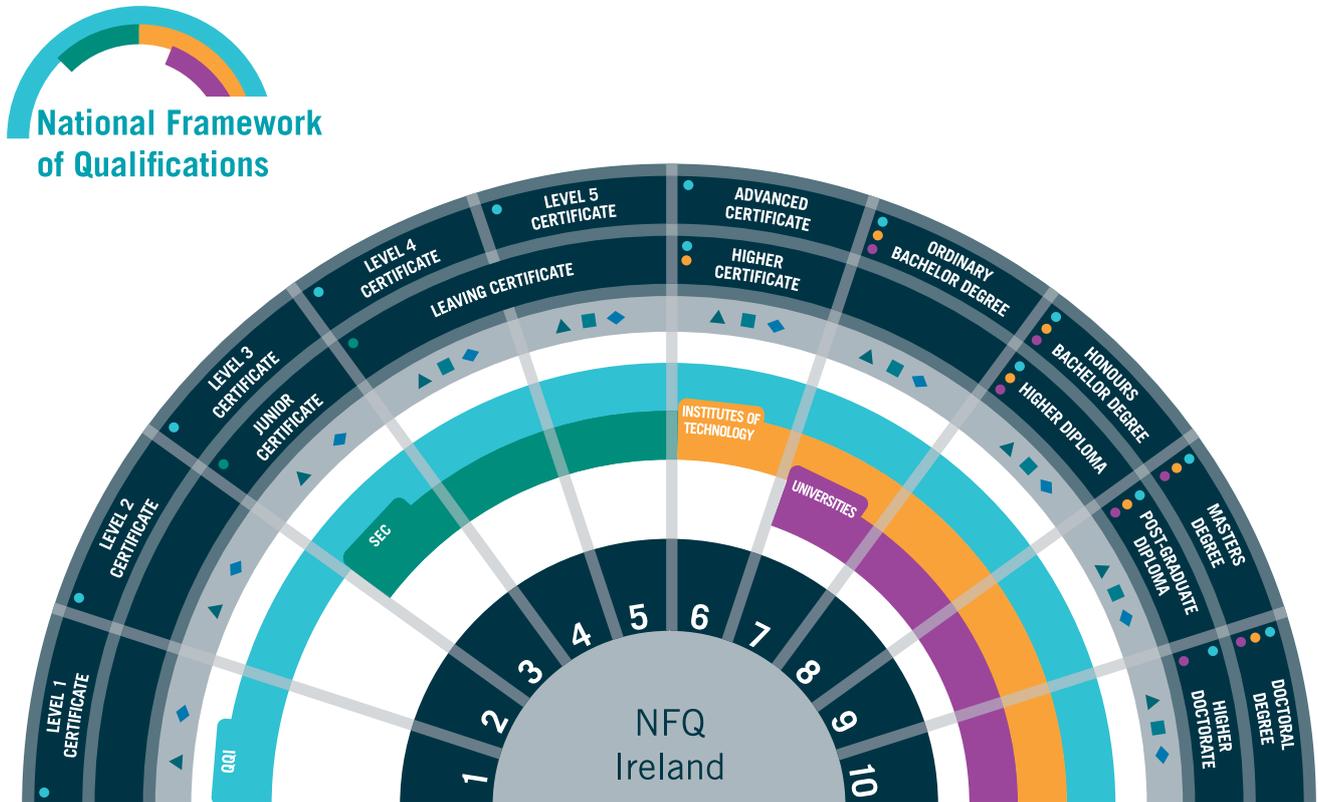
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# APPENDICES

## Appendix A: The National Framework of Qualifications Ireland (NFQ)



### AWARDING BODIES

- **Quality and Qualifications Ireland (QQI)** makes awards in further and higher education and training
- **SEC - State Examinations Commission** (*Department of Education and Skills*)
- **Institutes of Technology**
- **Universities**

### AWARDS IN THE FRAMEWORK

There are four classes of award in the National Framework of Qualifications:

- ◌ **Major Awards:** named in the outer rings, are the principal class of awards made at a level
- ▲ **Minor Awards:** are for partial completion of the outcomes for a Major Award
- **Supplemental Awards:** are for learning that is additional to a Major Award
- ◆ **Special Purpose Awards:** are for relatively narrow or purpose-specific achievement



For further Information consult: [www.nfq.ie](http://www.nfq.ie) [www.QQI.ie](http://www.QQI.ie)

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Participating Skillnet Networks are co-funded by Skillnet Ireland and network companies. Skillnet Ireland is funded from the National Training Fund through the Department of Further and Higher Education, Research, Innovation and Science.



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Taighde, Nuálaíochta agus Eolaíochta  
Department of Further and Higher Education,  
Research, Innovation and Science

