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Principles to award learning achievements for lifelong learning in health using micro-credentials: an international Delphi study

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Abstract

Background This research investigates micro-credentialing as an approach to recognise learning achievements in health. Establishing international standards can ensure consistency, promote equity, and enhance quality of recognition systems. Achieving stakeholder consensus on the key topic areas is an important precursor to lead to relevant topics from which to build appropriate standards. This research supports the efforts by UN agency representatives and experts in qualification systems, medical education, the health and care sector, regulation, and accreditation, to build foundations from which to launch normative work on the application of micro-credentials to award learning achievements for health and care workers.

Methods A modified Delphi study following methodological steps was conducted. From April to May 2021, a literature review investigated existing standards in *continuing professional development* and the use of micro-credentialing in health. Results from the review informed the initial draft of statements that were then refined through three iterative Delphi rounds between May to September 2021. The process culminated in a final workshop in March 2023.

Results A total of 53 participants completed the Delphi, with results analysed by researchers using qualitative analysis. Consensus was achieved on the core principles to recognise learning achievements. The expert panel agreed on the need for standards that are competency-based, and require evidence of learning indicating what a learner can do. There was also consensus that the characteristics of a valid digital award or micro-credential should be portable, standardised, secure, interoperable, stackable and verifiable.

Conclusions The growing body of literature on micro-credentialing highlights its potential as a method to recognise learning achievements. The interest in alternative pathways to award health practitioners, through short competency-based micro-learning opportunities, has spurred discussions on the practical application of micro-credentials. This research outlines the categories and principles for a proposed framework to implement micro-credentialing to recognise learning achievements within the health and care sector.

Keywords Micro-credentials, Learning recognition, Learning achievement, Continuing professional development, Competency-based education

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Introduction

New developments within the arena of *continuing professional development* (CPD) and the broader spectrum of lifelong learning in health are making new strides to facilitate implementation of competency-based learning with a focus on improving practice performance [1, 2]. In this original paper, we report on the research steps taken to build consensus on the principles to award learning achievements through micro-credentials. To our knowledge, this is the first original published research proposing micro-credentials as a common currency to recognise learning achievements of competency-based CPD. Continuing education is vital for maintaining the competence of health and care workers, ensuring they remain updated with evidence-based clinical guidelines, advancements in medical research, innovations in technology, and acquisition of new skills or procedures. These capabilities are essential for the optimisation of patient safety and quality of care. Yet, there are significant disparities in the availability and delivery of quality continuing education, and systems to recognise learning achievements across countries.

Global standards to recognise learning achievements and the competencies they represent have yet to be established in a way that is universally applicable across occupations and geographies. This creates challenges in maximising the efficiency, quality, and impact of education and training investments, hindering the development of a workforce aligned to needs. Current regulation systems for recertification or revalidation of different occupations continue to recognise learning based on participation rather than achievement [3, 4]. Given the diversity of CPD accreditation systems within the health sector, there is a growing demand for standards to guide regulation and establish clear criteria to enhance quality of continuing education, which in turn may improve health and care practices [5–8].

This research supports the World Health Organization (WHO)'s goal for equitable access to quality health services by promoting high-quality lifelong learning for health and care workers. To ensure that this award system meets the expectations of key stakeholders, we developed statements based on a literature review of learning achievement recognition, aligning expectations with broadly accepted terminology.

Competency-based continuing education

If competency-based education prepares pre-service learners to do the job, competency-based lifelong learning must also support health and care workers to do the job better [9]. Competency-based education for health and care workers emphasises continuous development, to maintain and update core competencies, so patients may receive the best possible care aligned to advances in science, technology and innovative practices. When implemented, competency-based education provides a framework for each learner, grounded in an individual's learning needs, that guides instruction, feedback, reflection, and continuous learning towards shared learning goals [1, 10]. Safe, effective patient care relies on competent workforces. A competency-based approach to lifelong learning encourages health and care workers to pursue both formal education and informal workplace learning [10, 11]. A significant challenge to implement competency-based lifelong learning is aligning competency-based frameworks with traditional continuing education and training structures, many of which continue to prioritise time-based learning [12–14], further complicated by the difficulty of systematically documenting informal learning, which lacks standardised metrics difficult to capture in formal recognition processes.

An approach to recognition of learning achievements using micro-credentials

There are a number of definitions of micro-credentials, and approaches to how micro-credentials are used across different disciplines [15]. Broadly, micro-credentials are described as awards that recognise the learning achievements of short learning programmes [16] that may be delivered online, onsite, or blended. Micro-credentials are awarded to learners who successfully complete a short learning programme and demonstrate acquired knowledge, skills or behaviours [17]. This approach enables learners to digitally store, share or stack awards, gathered from different learning providers representing different subsets of award types (diplomas, credits, units, certificates, digital badges, micro-credentials). Micro-credentialing offers an approach to learning recognition, that is particularly suited to CPD, providing a currency to learners and education providers that may systematically gather evidence of achievement.

Interest is growing in the advantages that a digital recognition system can offer learners, employers, and education providers as being flexible, transparent, accessible, and better aligned to a new era of digital learning for continuing education in health [16–21]. Micro-credentials that recognise smaller units of learning have the potential to enhance lifelong learning with tailored learning pathways [22]. Despite the potential advantages, there are expressed concerns that this approach to recognition will continue to award learners based on time and credit, already seen in some systems that have defined micro-credentials as a number of credits [23]. For micro-credentialing to effectively upskill and reskill workforces, it must be compatible with quality competency-based education

[24], focusing on what learners can do, rather than provision of credits for participation. Developing new learning pathways using micro-credentials must include reference standards to ensure quality and alignment with competency-based education.

WHO initiative

WHO provides evidence-informed guidance to member states on strengthening health systems and investing in health and care workforces to ensure safe, equitable care for patients. Through the WHO Academy, it offers lifelong learning programmes in health to global audiences of health and care workers in priority topics. Collaborating with regional, national and global stakeholders and experts in health and care worker education, qualification and accreditation, WHO advocates for delivering competency-based learning, tailored to individual needs, to drive improvements in patient and population health. By integrating competency-based education principles and emphasising the quality of digitally enabled recognition systems (such as micro-credentialing), this work aims to drive the transition towards high-quality education that enhances health and care workers capabilities and ultimately improves health outcomes, aligned to sustainable development goals (SDGs).

The findings of this research can inform the identification of topics for further investigation and the development of normative standards to support the adoption and implementation of micro-credentials for recognising lifelong learning achievements in health. The following research question was investigated: what categories and their underlying principles are essential to award learning achievements using micro-credentials?

Methods

Study planning and design

The specific steps taken as part of the Delphi process to gather and analyse data are set out in Fig. 1 [25, 26]. Delphi is widely used in education to lead individual expert opinions to group consensus [27, 28]. Our research approach reflects a modified Delphi process, where, similar to the traditional Delphi methodology, the first round begins with a qualitative study [29]. Our research approach first began with a literature review to inform the development of the questionnaire, typically used when basic information about the target issue is available [30]. The Delphi method remains a valuable methodological tool for developing guidelines, standards, and policy documents [29]. For this reason this method was selected as appropriate to achieve consensus on the principles of micro-credentialing as an approach to recognise learning achievement. The design and steps taken align with the recommendations for **c**onducting and **re**porting of **De**lphi **s**tudies (CREDES) [28].

Nomination of the experts

The principal investigator (SM), worked closely with WHO colleagues across the Health Workforce Department (SF, TW) and WHO Academy (JJ) as part of a core research team to refine statements, discuss feedback and guide decisions. *A steering group* was assembled to lead the Delphi process. The steering group included the following representatives: a health and care worker and member of a professional society (JJ), medical education experts (AR, JJ, MG, SM) and qualifications experts (GTM, JH) from different geographical areas.

Delphi participants were selected through an open call to WHO regional focal points for voluntary registration during April and May 2021. Members of the WHO Academy Quality Committee and the WHO Academy

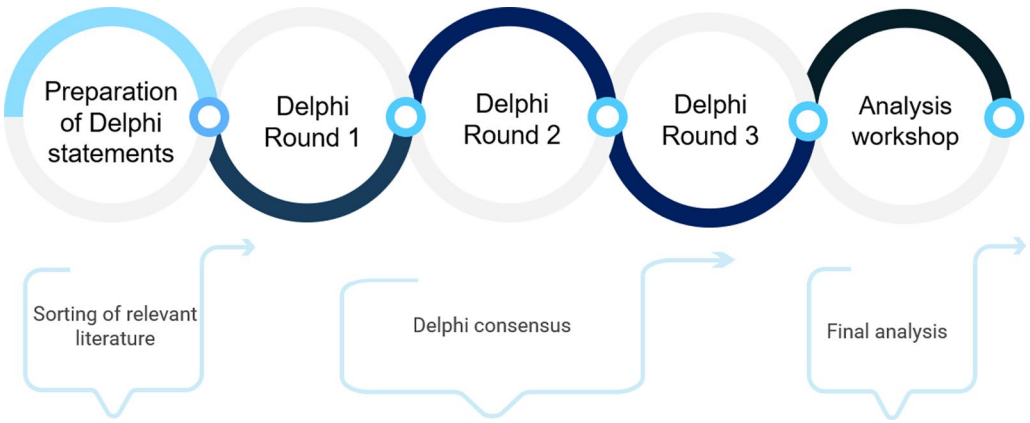

Fig. 1 Study design and approach to data analysis

Learning Recognition Group were also invited to participate. The call sought to recruit voluntary registrants from stakeholders including those with a background in education, digital recognition, employment, regulation, qualification and health professions education. All participants completed a mandatory registration process through the WHO database and were selected based on predefined criteria including occupational role, gender, professional affiliation and representation of WHO regions. Participants who completed Round 1 were invited to take part in Round 2. All participants who completed Round 2 were invited to take part in Round 3.

Preparation of Delphi statements using literature review

To identify relevant statements for the Delphi survey, a literature review was conducted during April and May 2021. The review process aligned to the prescribed processes for literature review and did not include a quality assessment [31]. We searched databases, ERIC, PubMed and Google, using key terms including "lifelong learning in health, health education, continuing professional development, national qualification framework, qualification system, digital credential, micro-credential*, digital badge, recognising learning achievement. Eligibility criteria focused on digital credentials or badges for learning recognition, micro-credentialing, and academic credentials. Supplementary search techniques including hand searching and consulting experts during the Delphi process were used [32].

Modified Delphi approach: survey rounds

Three iterative rounds of surveys were delivered between May and September 2021 using the online survey tool, *SurveyMonkey*. The survey statements, email invitation and introductory text were translated using multilingual experts into Spanish and French. Participants had up to 3 weeks to complete each survey round. Round 1 data were collected in May 2021. Round 2 data were collected in July 2021. Data for *Round 3* were collected in August 2021. The statements were then validated by the steering group (SM, JH, JJ). Statements were grouped by level of consensus (< 70%/70–80% / > 80%), and actions were taken by the principal investigator to conduct minor edits, extensive rewrites, or consult the literature to devise new statements [33]. The 80% threshold was chosen based on two determining factors; recommendations from the literature [29, 30], and consensus reached in the first Delphi round. As high levels of consensus were reached in round 1, the expert panel decided to set the cut off at 80% or higher [30]. This Delphi process aimed to achieve > 80% consensus on the presented principles of micro-credentialing. Participants had the opportunity to rate each item as either 'include without changes', 'include with changes', 'do not include' with open comments. Items reaching consensus in the first round were again included in the second round. The principal investigator organised and analysed comments and feedback from participants, sorted and identified categories and sub-categories following inductive qualitative analysis using NVIVO 12. Qualitative feedback and comments on micro-credentials were also collated.

Analysis of findings

All data were analysed to identify key concepts and organise final categories. The analysis of the Delphi rounds was conducted from October 2021—February 2022. A 2-h workshop with the research team took place in March 2022 (SM, TW, SF) together with a WHO staff member and consultant supporting this research. The meeting critically analysed data to improve statements aligned to feedback [34]. Researchers qualitatively analysed data independently and consolidated results applying investigator triangulation [35]. A final literature search was conducted in May 2023 to update findings using key terms, digital credential*, microcredential*, and digital badge for articles published in the PubMed database between 2021 and 2023. Once relevant literature was found, the principal investigator and steering group worked together to categorise themes.

Ethical considerations

All methods were performed in accordance with guidelines as presented in the Declaration of Helsinki [36]. Informed consent was gathered prior to data collection and gathered through voluntary signed consent during participant registration to the project. This research is conducted with the validation of our research application to the Swiss Cantonal Ethics Board Req-2023-00270.

Results

Preparation of Delphi statements using literature review

Published standards for recognising learning achievements in continuing education, CPD or lifelong learning in health are not widely available. Relevant papers were identified through handsearching to inform the first iteration of statements [37–40]. From 85 articles found on the ERIC database, 26 relevant articles were found on micro-credentialing, digital badges and related topics. Handsearching targeted reports, articles, and websites also found key sources, including the MIT Whitepaper on micro-credentialing [41], European Commission work on EUROPass [42] and the ISO/IEC standards for electronic credentials to name a few, which helped build statements focused on micro-credentialing. UNESCO provided much of the ground-work on definitions of micro-credentialing in

their published report [43]. After initial findings, the team updated search terms to expand our search using PubMed to include digital credential*, micro-credential*, digital badge* in May 2023 and found an additional 34 relevant articles published between 2021 and 2023. A further 15 qualification frameworks were found through handsearching used to inform the first iteration of statements for the Delphi. After the first Delphi round, an additional 6 qualification frameworks and key references were suggested by experts (supplementary file 1).

Of the 58 articles found on micro-credentialing alone, 40 were published between 2020 and 2022. This is significant, as relevant articles or reports found on *micro-credentials* or *digital credentials* were identified through handsearching or expert recommendations during the Delphi process (Digital Credentials Consortium, 2020, [44, 45]) rather than through databases where newly published literature is not yet listed. Following the literature review and consultations with experts, the steering group proposed an initial set of statements to be included within the first Delphi round.

Modified Delphi approach: survey rounds

Participants consisted of 53 experts, with a retention rate of 83% ($n=44$) in the second round and 49% ($n=26$) in the third round. Demographic characteristics of Delphi participants can be found in Table 1. Three participants completed the survey in Spanish.

Table 1 Demographic characteristics of the Delphi participants

Variable	Round 1 (%)	Round 2 (%)	Round 3 (%)
Participant responses, n (%)	53 (100)	44 (83)	26 (49)
Location based on WHO world regions, n (%)			
Region of the Americas	(26) 54	(20) 45	(12) 26
Western Pacific Region	(8) 17	(8) 18	(6) 23
Africa Region	(7) 17	(6) 14	(2) 8
European Region	(7) 15	(6) 14	(3) 12
Southeast Asian Region	(3) 7	(2) 5	(2) 8
Eastern Mediterranean Region	(2) 4	(2) 5	(1) 4
Sex			
Male	(19) 36	(23) 52	(12) 46
Female	(34) 64	(21) 48	(14) 54
Stakeholder type			
University/Research Institute	(15) 28	(12) 17	(6) 23
Professional Organization/ NGO	(16) 30	(13) 30	(7) 27
National Ministry	(6) 11	(6) 14	(4) 15
Accreditation/ Regulatory Body	(10) 19	(8) 44	(6) 23
Hospital	(3) 5	(3) 7	(2) 8
Other (incl. patient representatives)	(3) 5	(2) 5	(1) 4

Round 1

The first iteration of the modified Delphi study revealed an agreement of > 80%, with or without proposed changes on 69% of the statements with 402 collated comments. Recommendations were grouped into two categories. The *first* category sorted 95 comments that provided direct feedback on how to improve presented statements. The second category comprised of all other comments. All statements were revised to address language inconsistencies, improve clarity, incorporate suggested wording or changes, or to completely rewrite items. No items were deleted. The statements and comments were uploaded to NVIVO 12 and an analysis of key terms and phrases reduced overall statements to identified codes including:

- challenges of learning recognition
- call for clarification on use of language and terms
- use of portfolios
- competency-based outcomes.

Results of *Round 1* can be found in supplementary file 2.

Round 2

The level of agreement of > 80%, with or without changes, for all items in the second iteration of Delphi reached 94% (34 statements) with 120 comments and recommendations. The two items that did not reach consensus required extensive rewriting and an additional review of references. All statements required minor editing or rewriting based on comments and feedback (50 comments). No items were deleted. Comments were coded according to the set of codes identified in Round 1, and further organised into additional categories; the roles of stakeholders, the challenges of implementing a system to recognise learning achievements across borders and the need to clarify language on use of 'credentialing'. The results of the second round of the Delphi can be found in supplementary file 3.

Round 3

Due to the high level of consensus gathered in Round 2, the objective of Round 3 was to provide participants with an opportunity to offer additional comments or feedback. Participants were not asked to rate statements in this round. Only two items from Round 2, which did not reach > 80% consensus, were open for rating. Both items reached > 80% consensus of in Round 3. No new categories were identified. The results of this final round can be

found in supplementary file 3, where the results for the items open to voting are included in the table.

Analysis of findings

The categories are presented based on the results of an analysis workshop aimed at improving statements. Emergent categories are presented in Fig. 2. Specific actions included addressing feedback in the Delphi to clarify language on 'credentials' and 'credentialing', which have been replaced with 'micro-credentialing' or 'digital credentialing' as key terms.

The panel sought consensus through the Delphi process on the principles required for awarding micro-credentials to learners who successfully complete a learning programme. This deductive approach to analysis was guided by categories derived from the literature review, the Delphi process and expert consultations (Fig. 2). During the analysis workshop, the statements were further refined, improved, and are presented in Table 2. The panel agreed that standards for recognising learning achievements must be developed, grounded in competency-based education that reflect what a learner can do within a given context. There was also consensus that the principles for awarding micro-credentials must be portable, standardised, secure, interoperable, and stackable and easily verifiable (Table 2).

Discussion

To our knowledge, this is the first global study exploring international recognition of learning achievements using micro-credentials for health and care workers. Our findings indicate that micro-credentialing is gathering attention as an approach to recognise learning achievements for short, and blended learning programmes, particularly suited to CPD. The emergent principles for a micro-credentialing framework align with recently published standards for continuing education in health and build on existing literature [46]. Clarifying the language around micro-credentialing is needed to ensure it is understood not as a licence to practise, but as a standardised approach to recognise accomplishment of successful learning. Further research is needed to expand and refine additional categories for a more comprehensive competency-based micro-credentialing framework.

Our research question sought to investigate the topics and principles for a recognition framework using micro-credentialing. The findings identify areas for further investigation to guide the development of normative standards to recognise learning achievements for lifelong learning in health and care. New calls for quality competency-based education in this sector are increasingly recognised in peer-reviewed literature [47, 48], reflecting the broader sector-wide demand for micro-credentialing. This growing trend surpasses the reach of traditional national education systems.

Our literature review was essential to gather a wide range of statements to represent the purpose of a recognition framework using micro-credentials and applied to a competency-based learning approach. While elements of existing national frameworks were relevant, current qualification frameworks do not fully address the needs of short, competency-based learning programmes particularly relevant for CPD of practising health and care workers.

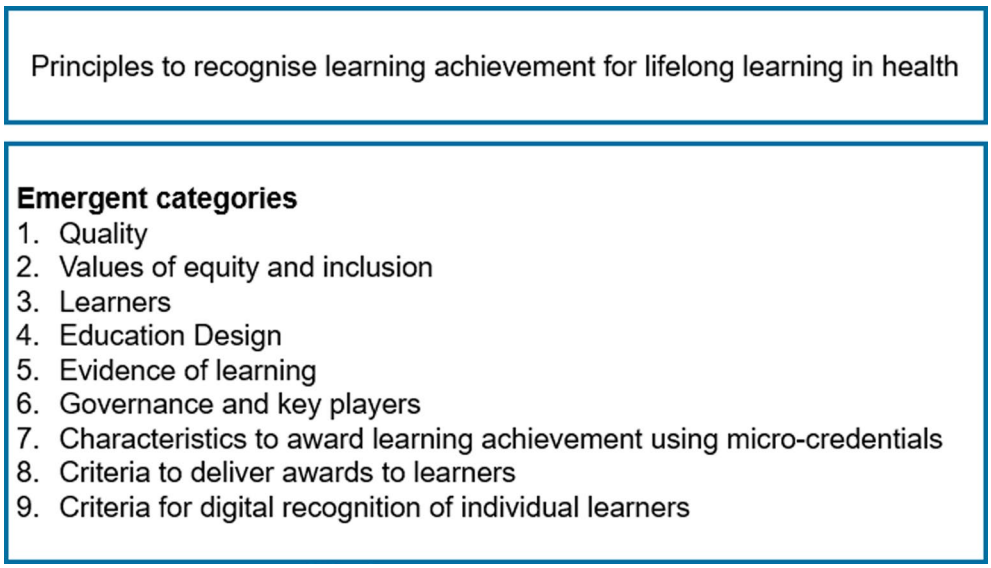

Fig. 2 Results of analysis workshop

Table 2 Underlining principles for recognising learning achievements using micro-credentials

Principles to award learning achievements using micro-credentials
1: Provision of quality education To maintain standards in health and care practice, it is essential to operationalise quality recognition systems that validate and enhance the credibility of a learner's competencies. These systems ensure that health and care workers are equipped with the knowledge, skills, attitudes and behaviours to deliver safe, effective and quality patient care
2: Values of equity and inclusion Recognition of learning achievements must be based on principles of equality, equity and inclusiveness, ensuring that all learners have equal opportunities, regardless of geographic location, culture, gender, age or disability. Access to education should be fair and inclusive for everyone
3: Learners A learner-centred approach is fundamental, placing the learner's needs at the centre of the design, development and delivery of education. This approach allows for personalised learning pathways and recognises individual achievements of each learner
4: Education design The design of education for health and care workers must align with the evolving needs of the healthcare sector, integrating competency-based principles, to ensure that learning is relevant, adaptable and applicable in real-world settings
5: Evidence of learning Recognition of learning should be awarded based on a learner's demonstrated competencies of *what they can do in a specific context, with awards granted upon* successful achievement and appropriate documentation of learning outcomes
6: Governance Effective governance and stakeholder engagement are essential to maintain the credibility and integrity of recognition systems, promoting accountability and supporting continuous improvements
6a: Key players A successful micro-credentialing ecosystem involves; **6.1** The awarding body defining the purpose, mission, and scope for recognising lifelong learning achievements, ensuring alignment with quality education principles **6.2** Learners who actively engage in lifelong learning and complete the learning activities as part of their ongoing professional practice **6.3** Organizations, institutions, societies, employers or quality assurance agencies that recognise or validate micro-credentials as evidence of learning achievement **6.4** Healthcare consumers/patients who drive patient centred care and healthcare outcomes
7: Characteristics of micro-credentialing Micro-credentialing, provides a flexible, portable, verifiable recognition of a learner's achievements, promoting consistency to allow for interoperability of awards **7.1** Digital micro-credentials are representations of a learner's knowledge, skills and attitudes, competencies, or professional achievements which can be digitally shared, and verified in real time **7.2** The flexibility of micro-credentialing systems should allow integration with various systems and platforms nationally and/or internationally **7.3** Portable micro-credentials should be transferable across labour markets, education systems, and/or other providers. The learner should be able to use the micro-credential in a variety of environments and carry their achievements throughout their education and professional journey, maintaining integrity across contexts **7.4** Standardised micro-credentials ensure consistency in design, assessment and recognition of learning, providing essential standards for awarding learning based on merit **7.5** Secure micro-credentials follow best practice in technology, including robust encryption and authentication measures for digital learning, while safeguarding privacy and security of learner profiles, protecting against fraudulent activities. Only authorised individuals should be able to access and share micro-credentials **7.6** Personalised micro-credentials are tailored to the learners individual learning path, allowing the learner to record achievements, relevant to their needs and context **7.7** Interoperable micro-credentials are standardised digital awards that can integrate with other education and employment platforms, enabling learners to easily share and showcase their achievements compatible with a wide range of electronic systems and platforms **7.8** Stackable micro-credentials are modular and flexible, forming part of a sequence that allows learners to build and customise their individual learning pathways towards higher qualifications, based on demonstrated competencies
8: Criteria to deliver an award to learners Metadata containing specific information on what the learner must accomplish to be awarded a micro-credential should be explicit and comprehensive. it includes the following; **8.1** Title of award: The title must be specific to the track or programme relevant to the learner's role, ensuring clear alignment with the learner's area of practice **8.2** Type of award: The type of award, such as a badge or micro-credential, should provide a framework for stakeholders to determine the appropriate award for different tasks being performed in various contexts. Awards should be awarded on merit **8.4** Description of the award: This should provide stakeholders with information on what the learner has achieved including the learning outcomes (details about knowledge, applied knowledge, demonstration or workplace practice), the module topics covered, the context of the learning environment, and information on equivalence where applicable **8.5** Description of evidence: This includes a description of how evidence of learning was collated, with details of the progressive framework for evidence collection throughout a learning programme **8.6** The expiry: The award's expiry date should be clearly stated, along with the prescribed learning outcomes that need to be achieved for renewal within a specific timeline

Table 2 (continued)

Principles to award learning achievements using micro-credentials
9: Criteria for digital recognition for individual learners Digital recognition criteria provides a framework for securely storing, sharing, and validating a learner's achievements, ensuring they accurately reflect diverse learning experiences that can be used across various platforms and contexts **9.1** Store: The learner must be able to access and securely store micro-credentials in digital portfolios, wallets or other platforms **9.2** Share: The learner must be able to display and share their micro-credentials, selecting specific awards to share with different users, or platforms or verification by potential employers **9.3** Reflect varied evidence: Micro-credentials can reflect a range of evidence gathered from diverse learning experiences, including formal and informal learning contexts. Formal learning includes structured educational programmes offered from Universities, professional societies, education providers, for example. Informal learning, involves workplace based learning, mentorship, communities of practice or professional development activities

Recent publications including *Standards for substantive equivalency between continuing professional development/continuing medical education accreditation systems*, offer some confidence to stakeholders that awards granted to learners uphold consistent quality in education, from delivery to outcomes [46]. This article introduces new perspectives on standards to recognise lifelong learning in health. As the article was published in 2021, the content was unavailable at the outset of our investigations [46]. Nevertheless, our findings broadly align with previously published standards for international recognition and accreditation of CPD [37, 46]. Our findings of the principles required to award learning achievements in health adds further weight to these newly published articles underpinning requirements that lifelong learning in health must consider a competency-based learning design, that is learner-centred, driven by fit-for-purpose assessment. These principles are distinctly different to principles outlined by qualification frameworks for secondary and tertiary education as they specifically address the dynamic, practice-oriented, and often interdisciplinary needs of health and care professionals engaged in CPD.

For some participants of the Delphi, *credentials* were understood to be a certified award or licensure to practise issued by an accredited education provider, generating confusion on the overall intention and objective of the project. In the context of this study, the term *credential* was, by definition, used to refer to an award to recognise learning achievement based on successful completion of any type of learning. The need to find common internationally agreed language for recognition of learning achievements was an important reflection on the use of internationally understood terms with presented definitions. For this reason, all final presented statements refer specifically to *micro-credential* for clarity of meaning.

All 36 statements reached consensus of > 80% by the third round, though a third of all statements (12 items) required an extensive rewrite during the process, bringing new dimensions to original statements. This may call into question whether there is truly a high consensus or presented statements were acceptable and applicable across contexts. We therefore recommend additional investigations on applicability of micro-credentials in different settings. As part of this process there must be specific actions to investigate and map potential 'gaps' in statements, to ensure that recognising learning achievements using micro-credentials cover all important principles of recognition.

Micro-credentialing, employed as a systematic process to recognise learning achievements may provide flexibility and granularity to learning recognition. Attaching micro-credentials to a competency-based framework attaches meaning to each successfully earned award, that may be stacked or combined to build meaningful records of learning achievements aligned to evolving personal and industry sector needs [43, 49]. However, micro-credentialing, will only be as effective as the quality of the education underpinning the award. This will require multistakeholder collaboration. Member states should advocate to adopt common principles and standards. Regulatory bodies must integrate these standards into their regulatory processes. Education provides must enhance the quality of their learning activities by designing programmes that align with competency-based standards. And, employers, in turn, should foster work environments that facilitate informal learning opportunities that may be validated together with recognition of formal learning using micro-credentials. Examples of use of micro-credentials across industry sectors continue to pre-dominantly refer to unit or credit-based systems such as Massive Open Online Course (MOOC) platforms [50, 51], further complicated by variations in definitions of micro-credentials [52], inconsistency in credit value [49], and absence of acceptable outcomes focused recognition frameworks. Within CPD, some efforts have been made to transition systems to recognise learning achievement towards outcomes-based achievements, as seen from continuing education model of the American Nurses Credentialing Centre (ANCC) [53].

The potential and challenges of implementing an internationally accepted system for recognising learning

achievements, particularly through micro-credentialing, are increasingly prominent in literary discussions. A key promise is the potential of micro-credentialing to enhance the recognition of health and care workers competencies, enabling greater adaptability across diverse clinical settings [54, 55]. This potential can only be upheld if there is consistency and rigour reflecting what a learner can do, or what they can apply in their practice. If not, the credibility and value of the award is called into question. A further challenge is that micro-credentials may contribute to a fragmented learning experience. Learners may accumulate isolated micro-credentials without developing a cohesive set of competencies that align with professional standards or industry sector needs.

To address these challenges, a systematic approach to award learning achievements must prioritise alignment with competency-based frameworks, established standards and labour market needs. With acceptable international standards, an approach to operationalise micro-credentials can ensure consistent recognition of skills, create a recognised currency in labour markets, enhance workforce mobility, and elevate the quality of continuing education.

Limitations and strengths

Inherent in the research of any new topic area is the challenge of limited published evidence or peer-reviewed articles, which often serve as the foundation for further research. Micro-credentialing and digital credentialing are emerging topics with evolving definitions and terms being discussed in the literature [43], often in reports rather than evidence-based studies. This was particularly challenging when developing key statements for the Delphi process, as qualification frameworks were primarily used as a reference, but they were not always applicable to the objectives of this project. Researchers also lacked literature references to substantiate statements regarding the recognition of lifelong learning for health and care workers. Participants represented 23 countries from all six WHO regions providing diverse global representation, though the geographic distribution may not fully capture nuances of al regions equally. The research highlighted the importance of precise language needed to ensure clarify of meaning. The need for internationally accepted terminology was a critical take away from this research.

Conclusion

Competence to perform in practice serves as a minimum baseline to ensure patient safety. Yet, education for health and care workers has been reactive to immediate health system needs or based on preferences of each individual learner, often falling short of improving practice performance. There is little consistency in how learning achievements are recognised in CPD. The misalignment between regulatory and accreditation systems, along with fragmented competency-based education systems are critical drivers necessitating reform. To address these gaps, it is essential to explore learning pathways that expand opportunities for individuals entering health and care careers. Micro-credentialing as an approach to award learning achievements, guided by common principles, offers a platform for new career pathways.

This research represents the first step towards developing a framework to recognise learning achievements through micro-credentials. The findings from this Delphi study outline overarching principles that position lifelong learning as competency-based, flexible, and responsive to learner and the health and care sector needs. These principles lay the foundations for collaborative work by WHO and other agencies, to refine specific, measurable standards that can support education providers and other stakeholders towards operationalisation. By advancing micro-credentialing as a "common currency" in education and employment, there is potential to drive transformative improvements in lifelong learning, with a broader impact on health outcomes. Engaging with stakeholders both within and beyond the health and care sector is essential to leverage the wider utility of micro-credentials to shape the future of workforce education and employment.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12960-024-00969-y.

Supplementary Material 1.

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Author contributions

SM was the lead researcher on this study, framing the research questions, collecting and analysing data and preparing the Delphi study. TW and JJ were influential in leading initial strategic discussions on the research goal, the study design, the results analysis and coding of qualitative data, providing supervisory support. JH supported SM with inter-round discussions on drafting the Delphi statements, incorporating feedback, reviewing the qualitative data during regular workshops with SM during the data collection phase. GTM and AR provided technical input into key discussions on the conceptual framework, understanding of the research question, the study design and

results of the study. SF provided insights into the relevance of the research to HWF, offered multiple rounds of feedback on the Delphi statements and the publication paper. All authors provided iterative feedback during the drafting of the final paper for publication submission.

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Availability of data and materials
All anonymised data are available in the supplementary materials of this publication.

Declarations

Ethics approval and consent to participate
This research is conducted with the validation of our research application to the Swiss Cantonal Ethics Board Req-2023-00270.

Consent for publication
Not applicable.

Competing interests
None declared.

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