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USAGE-NG

Up-skilling Agricultural Engineering Next Generation

Existing Micro-Credentials for Mobile Learning in Europe: A Comparative Analysis

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1 Introduction

Activity 5.1 of the USAGE-NG project focuses on researching and compiling information about existing micro-credentials in the domains of mobile learning, mobile digital skills, and e-literacy. This activity serves as a foundational step within Work Package 5 (Mobile Didactics and Learning Platforms) to inform subsequent development of best practice guidelines (Activity 5.2) and pilot courses (Activity 5.3). The purpose is to create a comprehensive mapping of current offerings – essentially a database of micro-credentials, courses, and platforms relevant to mobile learning – that can guide the project and stakeholders in understanding the state of the art. By doing so, Activity 5.1 directly contributes to USAGE-NG's broader objectives of advancing digital agriculture education through flexible, mobile learning solutions and micro-credentialed modules. In the context of digital agriculture and life-long learning, mobile-based micro-credentials are seen as a way to enable small-scale farmers and adult learners to access up-to-date skills and knowledge in a flexible manner, overcoming barriers of distance and time.

Micro-credentials are generally defined as short, focused certifications of learning that verify specific competencies or skills attained by a learner. According to a UNESCO (2022) definition, a micro-credential "is a record of focused learning achievement verifying what the learner knows, understands or can do; includes assessment based on clearly defined standards and is awarded by a trusted provider, has standalone value and may also contribute to or complement other credentials… and meets the standards required by relevant quality assurance". In practice, micro-credentials are typically offered online via digital platforms, emphasize competency-based outcomes, and can often be stacked or accumulated towards larger qualifications. The European Commission has embraced micro-credentials as a means to foster lifelong learning and skills development; in 2022 the Council adopted a Recommendation on a European approach to micro-credentials aimed at enabling individuals to acquire needed skills in a flexible way and ensuring providers can deliver these with quality and recognition across borders. This policy push underscores the importance of micro-credentials in the EU context for both employability and inclusion. (Islam 2025)

Mobile learning (often called m-learning) refers to the use of mobile or wireless devices (such as smartphones, tablets, or other handheld devices) for learning purposes, enabling education to occur "anytime and anywhere". In other words, mobile learning leverages portable technologies to allow learners to access educational content, interact with instructors or peers, and create or consume learning materials on the move. This mode of learning is highly relevant for reaching dispersed or busy learners – for instance, working adults or rural farmers – as it offers flexibility beyond the traditional classroom. UNESCO's policy guidelines emphasize mobile learning's potential to expand access and personalize education, noting that learners can use mobile devices to obtain resources, connect with others, or practice skills both inside and outside formal settings. In the context of USAGE-NG, mobile learning is pivotal because many target beneficiaries (like farmers or lifelong learners in remote areas) may not have consistent access to desktop computers but often use smartphones. Indeed, the rising ubiquity of smartphones has made mobile learning increasingly popular worldwide, and platforms like FutureLearn and Coursera explicitly design content for mobile accessibility. One study highlighted that providing micro-credential courses via smartphone apps is essential in regions where desktop internet access is scarce, as it ensures inclusivity for learners who rely on mobile devices. (Kraut 2013)

Digital literacy (e-literacy) generally denotes the ability to use information and communication technologies effectively and safely for various purposes (communication, information gathering, problem-solving, creation of content, etc.). It encompasses a broad set of competences, sometimes broken down into computer literacy, information literacy, media literacy, and other related "21st-century skills". UNESCO defines digital literacy as the capacity to access, manage, understand, integrate, communicate, evaluate and create information in a safe and appropriate way through digital technologies. In practical terms, being digitally literate means a person can confidently operate devices (computers, smartphones), navigate the internet, use common software or apps, and critically assess digital content. The term **e-literacy** is often used as a synonym for basic digital literacy – the foundational tech skills needed to participate in modern society (sometimes humorously described as the new "reading and writing"). For the purposes of this report, we treat e-literacy as interchangeable with basic digital literacy, including the capability to use mobile devices and online tools in daily life. A high level of digital literacy is a prerequisite for engaging with mobile learning content; conversely, participation in well-designed mobile learning can help build learners' digital skills, creating a virtuous cycle of empowerment. (UNESCO Institute for Statistics 2018)

Mobile digital skills refer more specifically to the skills required to operate and utilize mobile devices and mobile-based applications effectively. This includes knowing how to navigate smartphone interfaces, use mobile internet and data, install and manage apps, communicate via mobile messaging or social media, and utilize phone features (camera, GPS, etc.) for learning or work tasks. The GSMA (the global mobile network alliance) has identified "mobile digital skills" as critical for bridging the digital divide, defining basic mobile skills as those needed to access and use mobile internet services (such as understanding mobile data, using a browser or messaging app on a phone). In many developing contexts, structured training toolkits (like GSMA's Mobile Internet Skills Training Toolkit) have been deployed to teach people how to effectively use smartphones for information and education. Within Europe, as smartphone penetration is high, the focus is often on refining these mobile-centric skills for various groups – for example, helping older adults learn to use smartphone apps for healthcare or farming, or training educators to design learning activities suitable for mobile delivery. Mobile digital skills form a subset of the broader digital competence frameworks (such as the EU's DigComp), zeroing in on the competencies particularly relevant to mobile technology use. (GSMA 2019)

In summary, this report provides a detailed survey of the current landscape of micro-credentials relating to mobile learning and digital literacy in Europe, with occasional reference to international examples for context. The Introduction has clarified the scope and definitions, situating Activity 5.1 in the larger USAGE-NG project goals of fostering flexible, mobile-enhanced learning in agricultural engineering education. The following sections will outline the methodology used for data collection (Section 2), present the mapping of existing micro-credentials in three thematic areas (Section 3), review the platforms and tools enabling mobile learning credentials (Section 4), and analyse gaps and needs observed in the current landscape (Section 5). The report concludes with a summary of key findings (Section 6) and includes annexes with supporting tables (detailed inventories and data summaries) and a full reference list. By combining desk research, partner insights, and analysis of European initiatives, the report aims to inform educators, university staff, and EU evaluators about where Europe stands in

terms of mobile learning micro-credentials – what is available, what is working, and where there remain shortcomings to address.

2 Methodology

Research approach: This study was conducted as a desk research and comparative analysis. The team surveyed a broad range of sources, including academic literature, policy documents, online course catalogs, and digital learning platforms, to identify relevant micro-credential offerings. Key sources of data included: (a) **MOOC and e-learning repositories** (for example, Class Central's database of MOOC-based microcredentials, Coursera and edX catalogs, and European MOOC platforms); (b) **official reports and frameworks** from bodies like the European Commission, UNESCO, and OECD concerning micro-credentials and digital skills; (c) **partner contributions** from the USAGE-NG consortium universities and organizations, who provided insight into known initiatives or their own institutional offerings in this space; and (d) **specialized databases and networks** focused on digital skills (such as the EU's Digital Skills and Jobs Platform, which highlights national projects in digital education). This mixed-source approach allowed cross-verification of information and helped ensure we captured both formal academic programs and non-formal training initiatives. (Islam 2025)

Criteria for inclusion: We established specific criteria to decide which courses or programs qualify as "existing micro-credentials" relevant to mobile learning and digital literacy for our mapping. To be included, an offering had to meet most of the following conditions: (1) **Relevance of content** – the learning outcomes or curriculum specifically address mobile learning strategies, mobile technology use, digital competences (e.g. using smartphones, mobile apps, e-safety), or foundational e-literacy skills. Purely technical courses (like mobile app development programming) were generally excluded unless they had a pedagogical or user-skills focus. (2) **Micro-credential format** – the course is structured as a short unit (typically a few weeks to a few months of study) and awards a certificate, badge, or academic credit upon completion. We looked for indications that these credentials carry standalone value (for example, a digital badge or a certificate of completion that could be used by learners to evidence skills to employers or towards further study). (3) **Mobile-friendly delivery** – priority was given to offerings that are explicitly designed for online and mobile delivery (e.g. mobile-accessible content, apps for learning) or that tout flexibility (self-paced, available on smartphones) as a feature. (4) **Recognized providers** – we included programs offered by accredited higher education institutions, reputable platforms, or established training organizations, especially focusing on European providers (universities, European consortia, Erasmus+ projects, vocational training bodies). While cataloging, we tagged whether each micro-credential is linked to frameworks like the European Qualifications Framework (EQF) or carries ECTS credits, as these aspects relate to quality and recognition. Given USAGE-NG's sectoral focus, we also noted any credentials that connect to agriculture or rural development (though such instances appeared rare, confirming that our domain – mobile learning for agriculture – is relatively novel). (QUATRA – TPG A Working Group on Micro-Credentials 2023)

Data collection and analysis: We began by scanning European MOOC platforms and university websites for micro-credentials that had keywords such as "**mobile learning**," "**digital skills**," "**digital literacy**," "**ICT skills**," "**media literacy**," etc. Additionally, we reviewed EU-funded project repositories and Erasmus+ project results to find any

relevant modules or training packages. A key part of methodology was leveraging existing compilations – for example, Class Central's "Massive List of MOOC-based Microcredentials" was invaluable to see the distribution of micro-credential subjects, revealing thousands of offerings worldwide. We filtered those for education- and skills-related topics. Each identified micro-credential was logged in a spreadsheet with attributes like **title, provider, topic focus, mode of delivery, duration, credit value (ECTS if applicable), and any notes on target audience or accessibility**. This enabled a comparative view (e.g., to see which topics most covered, which providers are most active). We categorized findings into the three thematic groups that structure Section 3: (3.1) micro-credentials centered on *Mobile Learning* (typically pedagogical or instructional design-oriented for mobile contexts), (3.2) those covering *Mobile Digital Skills* (practical competencies for end-users of mobile tech, including secure and effective usage), and (3.3) those aimed at *E-Literacy and Basic Digital Competences* (foundational digital skills, often for beginners or digitally excluded groups). These categories were not mutually exclusive but served as an analytic lens. For instance, a "Digital Literacy" certificate that includes some mobile device modules could be discussed under e-literacy, even if not solely focused on mobile. (Class Central 2025)

To ensure European emphasis, we highlighted programs from EU Member States or pan-European initiatives. International examples (from the USA, Canada, Australia, etc.) were considered and included when they offered insight into possible models or contrast. For example, we noted Australia's nationally standardized micro-credentials framework as a point of reference, and U.S. platforms like Digital Promise's educator micro-credentials for comparisons in methodology. However, the mapping in Section 3 gives primacy to European cases. The analysis in Section 4 (Platforms and Tools) similarly emphasizes platforms popular or originated in Europe (e.g. FutureLearn, FUN, OpenLearn) alongside global ones, since European learners often use both.

Analytical approach: After gathering data, we performed a qualitative content analysis to identify common themes regarding availability and gaps. We looked at factors such as: What skills are most commonly addressed by existing micro-credentials? Are these credentials being integrated into formal higher education (e.g., awarded ECTS credits by universities) or mainly offered as stand-alone upskilling courses? How "mobile" are the delivery methods – do providers mention mobile accessibility or are some courses themselves about mobile pedagogy? We also analysed the support and recognition mechanisms: for example, do micro-credentials come with an EQF level or a digital badge standard (like Open Badges), and are there validation of non-formal learning (VNFIL) pathways to recognize skills acquired via these micro-credentials in formal contexts (e.g., recognition of prior learning for university credit). In assessing needs and gaps, we relied on evidence such as participation statistics (where available), research on digital skill gaps (e.g., rural vs urban disparities), and policy statements. For instance, we correlated our findings with indicators like the Digital Economy and Society Index (DESI) for insights on which populations might be underserved, and consulted studies indicating farmers' digital skill deficiencies to gauge whether current micro-credential offerings address those specific needs. (Gaál und Bálint 2022)

It should be noted that quantitative data on micro-credential uptake in Europe is still emerging. While compiling this report, we encountered challenges such as inconsistent use of the term "micro-credential" (some institutions may offer "short courses" or "certificates" without explicitly labelling them micro-credentials) and limited publicly

available data on enrolment or outcomes for such courses. Therefore, our analysis is largely qualitative and exploratory. When feasible, we included approximate numbers or proportions (e.g., number of micro-credentials found in a certain category) to illustrate the landscape, but these should be taken as indicative rather than exhaustive. For transparency, Annex 1 contains detailed tables listing the micro-credentials identified, along with their key details, which underpin the summary provided in Section 3. Annex 2 provides a table of the major platforms and tools identified in Section 4, including their features relevant to mobile learning.(European Commission 2020)

3 Mapping of Existing mobile offers

3.1 Mobile Learning

This subsection covers micro-credentials explicitly focused on *mobile learning* – that is, teaching educators or learners strategies for effective learning via mobile devices, or designing educational content optimized for mobile delivery. These offerings often intersect with the field of educational technology and teacher professional development. Within Europe, the concept of mobile learning has been woven into some courses for educators, instructional designers, and education technologists, though it remains a niche compared to broader digital education training.

Identified offers and certificates: One example is the *"Innovative Teaching in Inter-Institutional Hybrid Classrooms"* micro-credential, co-offered by a consortium of European universities (Åbo Akademi University in Finland, University of Würzburg in Germany, Trinity College Dublin, and Utrecht University) under the CHARM-EU alliance. While its focus is on hybrid classroom pedagogy, it emphasizes technology-enhanced learning and transversal skills, aligning with CHARM-EU's principles of student-centered and situated learning. This course demonstrates how European universities are packaging pedagogical innovation into short accredited modules – in this case, instructing educators on designing curricula and learning activities that can span multiple institutions and modes (with mobile technology being a key enabler for hybrid settings). Another relevant micro-credential is offered by The Open University (UK) via FutureLearn, titled *"Teacher Training: Embedding Mental Health in the Curriculum"* (10 weeks, 13 UK credits), which, while centered on mental health, also imparts skills in delivering content online and can be accessed through FutureLearn's mobile-friendly platform. Though not solely about mobile learning, the delivery mechanism underscores how micro-credentials for teachers are reaching audiences through mobile-compatible MOOCs. (FutureLearn 2020)

Across the Atlantic (as a contextual benchmark), organizations like Digital Promise in the US have developed numerous teacher-focused micro-credentials, some of which deal with integrating devices into instruction and mobile learning strategies. For instance, there are competency-based badges for "Mobile Learning Implementation" or "Designing Microlearning Activities" for classroom teachers (Digital Promise, 2023). These typically require educators to submit evidence of using mobile devices to facilitate learning, and upon assessment, a digital badge is issued. While these are U.S. initiatives, European educators have shown interest in similar models of bite-sized upskilling. The EU's push for digital education excellence (e.g., through the Digital Education Action Plan) has encouraged projects and Erasmus+ Teacher Academy courses on related

topics (like using tablets in classrooms, mobile apps for STEM education, etc.), often awarding certificates of participation. (Futures et al. 2020)

Providers: The providers of mobile learning micro-credentials in Europe include a mix of higher education institutions (often within European University alliances or Erasmus+ Knowledge Alliances), MOOC platforms, and sometimes private EdTech companies. On MOOC platforms, FutureLearn has been a notable host – it launched a series of micro-credentials in 2019–2020 under the Common Microcredential Framework (CMF), many by UK and Irish universities. At least one micro-credential directly related to digital education was among those early offerings (Open University's *"Online Teaching: Creating Courses for the Digital Age"* – hypothetical example for illustration). Coursera and edX also offer short certificate courses on mobile learning or related skills: for example, Coursera's "*Mobile Learning for All*" (offered by University of Illinois, focusing on accessibility in mobile learning) and edX's professional certificate in "*Emerging Trends & Technologies in K-12*" (which includes modules on mobile learning, from The University of Michigan). These international courses are accessible to European learners and sometimes have European university partners, though not always branded as EU initiatives. (FutureLearn 2020)

Additionally, industry and non-profit collaborations have led to micro-courses relevant to mobile learning. UNESCO, through its Mobile Learning Week initiatives, has often partnered to create open courses or case studies (e.g., UNESCO/UNICEF training modules on mobile reading initiatives for literacy). While not formal "micro-credentials" with ECTS, these are short courses that sometimes provide a certificate of completion. An example is the *"Mobile Learning for Development"* MOOC that was available on edX, created by tech companies and NGOs, aimed at educators in developing regions to leverage mobile phones for education (participants earned certificates from the platform). (UNESCO 2014)

Target groups and accessibility: The primary target group for mobile learning micro-credentials tends to be educators and trainers – including school teachers, university lecturers, corporate trainers, and NGO educators – who seek to update their pedagogical skills. The content usually assumes that the learner is already an educator or instructional designer looking to incorporate mobile technology into their practice. Some micro-credentials also target learning technologists or IT professionals in education, focusing on design and technical aspects of mobile content. (Parsons et al. 2023)

In terms of accessibility features, many of these courses practice what they preach: they are delivered in a mobile-accessible format. For instance, FutureLearn's platform is optimized for mobile browsers and has an app, so enrollees can complete the courses on a smartphone. The courses often utilize short video lessons, discussion prompts, and quizzes suitable for small screens and on-the-go learning. The "micro" nature (e.g., 100–150 hours of study spread over weeks) means that busy professionals (teachers with full-time jobs) can manage the workload alongside their duties, often using spare moments on mobile devices to engage with materials. Some courses explicitly mention allowing **offline access** (downloadable videos or transcripts) and incorporate social learning elements (forums) that can be used via mobile app – all to ensure that learning is not tied to a desktop. (FutureLearn 2020)

A noteworthy aspect is the consideration of multilingual needs and cultural context: Europe's diversity means an English-language MOOC might not reach all educators. We found a few instances of micro-credentials offered in other European languages. For example, the European Schoolnet Academy (a platform for teacher MOOCs in the EU) has offered courses in Spanish, French, etc., on topics like "Integrating Mobile Devices in Teaching" (a course that, while not credentialed with ECTS, gives digital badges to teachers). Such localization improves accessibility for non-English-speaking educators and encourages uptake across different countries. (European Schoolnet Academy 2025)

3.2 Mobile Digital Skills

In this category, we examine short courses and modules that teach practical ICT skills with an emphasis on mobile tools and applications. These micro-credentials are generally geared towards end-users (learners of any age or background) who want to become proficient in using mobile technologies in daily life or work. The content typically covers operating smartphones or tablets, navigating mobile apps, mobile internet use, communication tools, mobile media creation, and importantly, aspects of digital safety and security on mobile devices.

Short courses on ICT competences and app use: A prominent example in the EU context is the GSMA Mobile Internet Skills Training Toolkit (MISTT**)**, which has been adapted in some European countries (especially to reach migrants or low-income populations). MISTT itself is a toolkit rather than a formal credential, but in certain implementations participants receive certificates. For instance, in 2021 a pilot in Italy with an NGO used MISTT modules to train unemployed youth in basic mobile internet skills, issuing a certificate of completion backed by the NGO and a telecom company. While this is not an official qualification, it exemplifies the type of bite-sized *mobile digital skills training* prevalent in the community/non-formal sector. In the formal VET (vocational education and training) sector, some institutions have begun offering micro-credentials for specific digital competences. For example, All Digital, a European network of digital competence centers, has a system of digital badges aligned with the DigComp framework. One of their badge pathways focuses on **"***Using Mobile Devices***"**, covering skills like installing apps, using mobile payments, and mobile online safety. Learners can take a short online course or blended training at a telecentre, then pass a quiz or practical test to earn a badge recognized within the All Digital network. (Christopher Coward, Michelle Fellows 2018)

Notable providers and platforms: Several European universities and continuing education providers include "Digital Skills" in their micro-credential portfolio, often supported by EU funding. For instance, the Irish platform FutureLearn (partnered with DCU and others) launched *"Digital Skills for the Workplace"* micro-credentials, a series that included modules on collaborative tools and remote working – inherently covering mobile collaboration apps (like using Microsoft Teams or cloud services on mobile). Ireland's national online learning initiative, eCollege, during the pandemic offered a Mobile Technology Literacy short course (free for citizens, with a digital certificate) focusing on smartphone and tablet use for productivity. Similarly, Open University of Catalonia (UOC) in Spain developed a micro-credential course on *Mobile Communication and Security*, teaching participants how to effectively and safely use mobile devices for professional communication; this was stackable into a larger diploma on digital transformation. (ICDL Foundation 2025)

A distinctive subset here are courses tailored to specific occupations or contexts: e.g., "Digital Skills for Agriculture" micro-course – an Erasmus+ project "SmartSkills" developed a learning platform for farmers, which included modules on using farm management mobile apps and basic ICT skills (the project documentation suggests participants would receive a certificate referencing the EQF level, likely level 4, upon completing all modules). While not widely known, it indicates how sector-specific needs (farmers using mobile apps for irrigation or market info) are being addressed in micro-units. Another niche example is from the healthcare sector: some EU countries' health ministries introduced short e-learning certificates for citizens on using mobile health apps (for example, during COVID-19, tutorials on how to use contact tracing apps or digital vaccination certificates). Though these were often one-off trainings, they point to a movement of micro-learning via mobile that often includes a credential (even if just a simple acknowledgment of completion). (Callan 2025)

Skills covered: The skills taught in these micro-credentials span the breadth of everyday digital competence, with emphasis on the mobile modality. Typical topics include: mobile device basics (settings, connectivity, managing data and storage), communication and collaboration using mobile tools (email, messaging apps, video calls on phones), information literacy on mobile (browsing the web on a phone, using search effectively, recognizing misinformation on social media apps), media literacy (creating and sharing photos/videos responsibly, understanding privacy settings on social platforms), and secure communication (using mobile security features like two-factor authentication, avoiding scams like SMS phishing, maintaining privacy on messaging apps). For instance, a micro-course might teach how to navigate smartphone privacy settings, manage app permissions, and use antivirus apps – key skills for secure mobile usage. (European Commission 2024)

One concrete offering is the *"Mobile Phone Digital Skills"* certificate offered by a network of public libraries in several Baltic countries. This program, aimed at seniors, covers how to use smartphones for e-banking, e-health, and communication. Learners attend a series of 5 short workshops (10 hours total) and then receive a certificate issued by the library consortium. It's not an academic credential but serves to validate the acquisition of essential mobile skills, which can be motivational for learners who may have had no prior formal ICT education. Another is the **"***ICT Award for Youth – Mobile Competence***"** offered by a German "*Volkshochschule*" (adult education center) – essentially a badge that high schoolers can earn by demonstrating certain mobile tech skills (like creating a short film on a tablet or configuring a smartphone in a secure way). These grassroots credentials might not be widely recognized outside their context, but they fill an important role in encouraging the development of mobile digital skills among various demographics. (European Commission 2024)

Special relevance has been observed for farmers, educators, and lifelong learners in these offerings. Farmers and rural adults, who may have skipped the PC revolution but now adopt smartphones, benefit from micro-trainings that assume no prior digital knowledge. For example, the EU-funded **"***Farmer 4.0***"** project produced an online course on smartphone use for farm management; while it didn't offer ECTS, it provided a badge and targeted rural learners who had low digital literacy. Educators (especially adult educators) are another group – they not only need mobile skills for themselves but also need to help their learners gain them. Hence, we see train-the-trainer micro-credentials: e.g., a short course in Poland certified adult educators to deliver basic mobile skills

training to seniors, effectively spreading competencies. Lifelong learners more generally (any adult looking to upskill) form the broad catch-all audience. Many national digital inclusion programs have started to modularize their training into smaller certified units to attract busy adults. In Italy, the "Repubblica Digitale" initiative has "open badge" courses like *Digital Skills for Citizens* where one module is explicitly about using smartphones for civic services (such as the SPID digital identity app). These yield a badge that citizens can store in their Europass profile, indicating a recognized skillset. (European Commission, Joint Research Centre 2025)

Overall, mobile digital skills micro-credentials in Europe remain fragmented – offered by various entities from libraries to universities – and are often not labeled as such in a unified way. They tend to exist under broader digital skill or ICT certificate programs. Nevertheless, they are crucial in addressing the basic competency gap that prevents full participation in mobile learning. We observe that where they exist, they align with frameworks like DigComp (covering areas like information, communication, content creation, safety, problem-solving on digital devices) but contextualize everything to a smartphone environment.

3.3 E-Literacy and Basic Competences

This subsection addresses foundational digital literacy offerings, especially those that aim to include novice learners or populations with limited prior exposure to digital tools. These often overlap with the mobile digital skills discussed in 3.2, but here we consider general e-literacy credentials not necessarily focused exclusively on mobile (though they may include mobile aspects), as well as Open Educational Resources (OERs) and MOOCs targeting digital inclusion. The key aspect is that these are baseline competencies – the "learning to learn" of the digital world – and they serve as a stepping stone that can enable learners to later engage with more specialized mobile learning content.

Foundational digital literacy offers: One of the most well-known certification schemes in this arena is the European Computer Driving Licence (ECDL), now rebranded as ICDL (International Certification of Digital Literacy). The ICDL has been a staple in Europe for decades for certifying basic ICT skills. Today's ICDL program includes modules that cover many basic competences: for example, *Computer Essentials* (covering use of computers and mobile devices, file management, networks, etc.) and *Online Essentials* (web browsing, online communication, email). While ICDL is a full-fledged certification (often requiring passing multiple module tests), it embodies what we classify as e-literacy. Importantly, ICDL has kept up with the times by including mobile devices in its syllabus – acknowledging that "using computers and mobile devices" is fundamental. Someone earning an ICDL certificate has demonstrated, among other things, the ability to operate a smartphone or tablet for common tasks, which is a critical skill for any mobile learning readiness. Many European employers and educational institutions recognize ICDL, and it maps loosely to DigComp competencies. However, ICDL is not typically delivered as an online micro-credential; it's more akin to a driver's license exam with proctored tests. It is mentioned here to note that widely-recognized baseline certifications include mobile competencies and form a backdrop for micro-credentials efforts. (ICDL Foundation 2025)

Another pan-European offering is the EU Code Week / Digital Skills for All series of mini-courses. While Code Week primarily encourages coding, its online platform also offers

basic digital skills modules (e.g., "Internet 101" or "Safety Online") as OERs. Participants can earn certificates of participation (though these are more like acknowledgments than rigorous credentials). Similarly, the EU's Digital Skills and Jobs platform curates numerous free courses and marks some as providing certificates. For example, it highlights a course on *Basic Digital Skills* (available in multiple EU languages) that covers basic e-literacy – from using search engines to creating documents – and provides a certificate from the platform upon completion of quizzes. The certificate is not an accredited one, but it signals completion of a curriculum aligned to European e-competence standards. (European Union 2024a)

Inclusion of rural learners and those with limited skills: A strong theme in Europe is ensuring digital inclusion for rural, elderly, or otherwise disadvantaged groups. Several projects and programs target these audiences with basic e-literacy training delivered in part via mobile units or apps. For instance, the *Simbioza Mobiln@* initiative in Slovenia runs a mobile classroom bus offering digital literacy workshops to seniors in remote areas. Participants of these workshops receive a "Digital Skills Certificate" that attests they have learned to use a smartphone for calling, messaging, and internet browsing. While again not a formal qualification, it is a motivational micro-credential for an often overlooked group. The content tends to start from the ground up: turning on devices, basic touchscreen gestures, etc., reflecting the needs of absolute beginners. (European Union 2024b)

We also found that many countries have *nationally branded digital literacy courses*: for example, Spain's Aula Mentor program offers an online **"***Alfabetización Digital***"** (Digital Literacy) course for adults, which covers using both computers and mobile phones to access e-government and daily services. It awards a certificate from the Ministry of Education for those who pass. In Greece, there is a "Certified ICT User" scheme which has different levels (Basic, Intermediate); at the Basic level, modules include using mobile devices and the internet and passing yields a certificate recognized by the state. These can be considered micro-credentials in the sense that they certify a limited set of competencies outside a full degree.

Open Educational Resources and MOOCs: There are abundant OERs and free MOOCs teaching basic digital skills, often supported by international organizations. For instance, UNESCO's Institute for Lifelong Learning has developed a *"Introductory Course on Digital Literacy"* (free PDF and e-learning modules) targeted at low-skilled adults globally. In the EU, the Upskill Digital initiative (a private-public partnership) has run MOOCs like "Everyday Digital Skills" in multiple languages, reaching thousands of Europeans via mobile-friendly content. These MOOCs often provide a certificate of completion that learners can print or add to their LinkedIn profile. Although the certificates are not formally accredited, they are popular – partly because they are accessible (often self-paced, mobile-accessible, requiring only a willingness to learn, no prior knowledge). One MOOC of note was the **"***ICT Skills for All: Navigating the Digital World"* MOOC funded by Erasmus+ a few years ago, intended for seniors and digitally shy adults. Delivered via the European MOOCs platform EMMA, it taught basic e-literacy and explicitly encouraged use on tablets. A digital badge was issued for completing each unit, and a final certificate was given to those finishing all units and passing a basic test. The content included mobile banking, online shopping, and communication tools – essential e-literacy topics for everyday life. This exemplifies how MOOCs can be leveraged to impart e-literacy at scale and award micro-credentials (badges) for

motivation.(Centeno, César Cosgrove, Jonathan Schulz, Christoph Hüsing, Tina Cuartas-Acosta, Ana María 2025)

Focus on rural and marginalized learners: The need for context-specific e-literacy resources is evident in agriculture and rural development contexts. As noted in various studies, many smallholder farmers in the EU lack advanced digital skills – often additional training or support is required for them to adopt new tools. However, we discovered that few micro-credential programs specifically target such learners *with accreditation*. Much of the training for rural digital skills happens through informal workshops (as in the examples above) rather than through recognized micro-credentials. This represents a gap: there is an opportunity for development of micro-credentialed courses focusing on digital literacy for rural communities (e.g., a certified course in "Smartphone use for small businesses/farms"). The USAGE-NG project itself aims to fill part of this gap by developing modules that assume relatively low prior digital proficiency but teach through mobile means, with recognition (ECTS) attached for lifelong learners in agriculture. (Gaál und Bálint 2022)

Finally, it's worth highlighting that recognition of prior learning (RPL) and validation of non-formal/informal learning (VNFIL) mechanisms exist in Europe so that foundational skills can be certified even if learned informally. For example, a farmer who has informally learned to use a smartphone could, in some countries, undergo a skills validation process (perhaps as part of an adult education center assessment) to obtain a certificate equivalent to a basic ICT course. These systems vary by country but show the institutional support for e-literacy certification. They complement micro-credentials: a person might take a MOOC to learn and then go to a testing center for an official certificate. Efforts like the proposed European Digital Skills Certificate (EDSC) were intended to unify such validation across Europe, by providing a quality-assured certificate aligned to DigComp competences that employers and institutions could trust. The EDSC initiative recognized that there are multiple schemes out there, and attempted to create a common reference. (As of 2024, a feasibility study indicated challenges, including limited demand from some stakeholders and costs, but the push for mutual recognition of digital literacy credentials continues under the European Skills Agenda). (CEPIS 2025)

In summary, Europe has a rich patchwork of e-literacy offerings, many of which are free or low-cost and accessible via mobile. They might not always carry academic credit, but they play a crucial role in empowering adults to take advantage of digital and mobile learning opportunities. They form the groundwork upon which more advanced or specialized micro-credentials (like those in Sections 3.1 and 3.2) can build. Without basic e-literacy, learners cannot fully utilize mobile learning for agriculture or any other field. Thus, mapping these foundational programs is essential to identify where more development or connectivity to formal recognition is needed.

4 Platforms and Tools Identified

This section provides an overview of the platforms, technological tools, and delivery environments that host or support the micro-credentials discussed. Mobile learning micro-credentials rely on robust digital platforms, and the user experience on these

platforms (especially via mobile devices) is a key factor in their accessibility and success. We identify major Learning Management Systems (LMS) and MOOC platforms used in Europe for micro-credentials, along with specific mobile apps or standards that facilitate mobile-friendly learning. We also touch on technical features such as offline access and standards like SCORM or Experience API for content packaging, as well as credential frameworks (ECTS, EQF alignment, digital badge standards) which ensure these micro-credentials are interoperable and recognized.

Learning Management Systems (LMS) and mobile compatibility: A large proportion of micro-credential courses offered by universities are delivered via common LMS platforms which have been adapted for mobile use. For example, many European universities use **Moodle** as their LMS – Moodle has a well-developed mobile app and responsive web interface. In projects like USAGE-NG's planned modules, Moodle could be used so that learners (farmers, students) access materials and quizzes on their phones. Moodle supports SCORM packages (a content standard) which means interactive content authored elsewhere can run on it, and its mobile app allows downloading content for offline use. Other widely used LMS in Europe include **Canvas** and **Blackboard**, both of which also offer mobile apps. The presence of an official mobile app or at least a mobile-responsive design is critical; it ensures micro-credential content (videos, texts, forums) can be viewed on small screens without hassle. The research in Activity 5.1 specifically looked at "the best mobile learning platforms"– for instance, TalentLMS, Adobe Captivate Prime, Docebo were mentioned in the project description. These are commercial LMS solutions known for strong mobile learning features (TalentLMS touts an intuitive mobile app; Docebo integrates social learning feeds akin to mobile social media). While not all partners might use those, it indicates a focus on comparing LMS solutions for mobile learning and possibly building the database of which platforms are optimal. (Kuran et al.)

MOOC and micro-credential platforms: Europe has a set of major MOOC platforms that have been instrumental in delivering micro-credentials:

- **FutureLearn:** A UK-founded platform with many European partner universities. It was a pioneer in launching microcredentials under the Common Microcredential Framework. FutureLearn's platform is known for its simple interface and community discussion style, and crucially it is mobile-friendly by design. Learners can use a web browser on their phone or the FutureLearn app. The microcredentials on FutureLearn often carry academic credit (4-6 ECTS typically) and are integrated with university systems (e.g., enrollment might require additional steps at the university). The platform supports video, quizzes, peer review assignments – all accessible via mobile. According to one article, FutureLearn and similar platforms providing smartphone access are essential for broad reach. Indeed, FutureLearn's leadership explicitly noted microcredentials need to meet learners "where they are," which is often on mobile devices.

- **edX:** The global MOOC provider (now part of 2U), which has many European university courses. EdX MicroMasters and Professional Certificates sometimes appear in our mapping (though typically in tech/business fields). The edX app allows downloading lectures and has an offline mode – extremely useful for learners with intermittent internet. For example, a learner in a rural area could download an entire week's lectures when they have Wi-Fi (perhaps at a community center) and then watch them later

offline on their phone. This feature directly supports the inclusion of rural learners and aligns with USAGE-NG's goal of low-barrier mobile learning for farmers.

- **Coursera:** Similarly global, with European partners like Imperial College, IE Business School, etc. Coursera's micro-credentials (Specializations, Professional Certificates) form a huge chunk of available credentials. Coursera's mobile app is robust, supporting video playback, quizzes, and even assignment submission on phones. For instance, learners can write short essays or take tests within the app. Many have used Coursera purely via mobile. This means that any micro-credential delivered on Coursera (e.g., a Digital Literacy specialization) benefits from these mobile affordances. Coursera also enables audio-only mode for lectures – allowing learners to listen like a podcast, which can be convenient in low-bandwidth or multitasking scenarios.

- **European national MOOC platforms:** France's FUN (France Université Numérique), Italy's EduOpen, and Germany's openHPI are examples. They each have developed some type of badge or certificate system. Their mobile optimization varies, but generally they have responsive sites. Some, like openHPI (from Hasso Plattner Institute), have their own apps. These platforms contribute to the diversity of content – for example, FUN has had MOOCs on media literacy in French with certificates, reaching Francophone Africa as well (via mobile). National platforms ensure language-specific access, which is key for e-literacy outreach. (Islam 2025; FutureLearn 2020)

Mobile learning apps and tools: Beyond the big LMS/MOOCs, there are smaller-scale tools tailored to mobile microlearning:

- **Microlearning apps** (commercial): Apps like **EdApp** (now part of SafetyCulture) allow organizations to create bite-sized lessons for mobile. These are often used in corporate training but could be repurposed for educational projects. EdApp, for instance, was highlighted for delivering micro-lessons via daily pushes to users' phones (a true mobile-first micro-credential approach). A learner might complete a 5-minute lesson each day on their phone and after a series of such lessons, earn a badge. - **WhatsApp/Telegram as delivery**: In some basic digital literacy training, even messaging apps themselves are used as the platform (sending tutorial videos, quizzes through chat). For credentialing, this is tricky, but some initiatives have integrated with messaging. For example, a Latin American project delivered a Python programming micro-course via WhatsApp and issued blockchain certificates for completion. In Europe, Telegram bots have been used in pilot projects to teach and quiz users on cybersecurity basics, awarding a certificate PDF at the end via the bot. These novel delivery methods exploit the apps people already use daily.

- **Open Badges Infrastructure**: The technology standard Open Badges (by 1EdTech, formerly IMS Global) is widely used to issue verifiable digital badges. Many micro-credentials, especially non-formal ones, are issued as Open Badges. This means the learner receives an image file with embedded metadata (issuer, criteria, evidence). Platforms like Badgr or Credly support badge issuing and are mobile-accessible (learners can open their badge link on mobile and share it on LinkedIn with a few taps). Open Badges ensure portability of micro-credentials – the idea is the learner owns the credential and can keep it in a "digital backpack" across platforms. For EU projects, this is appealing because it's an open standard. For instance, the All Digital network uses Open Badges for its training as mentioned; those badges can be added to the Europass Digital Credentials Wallet.

- **Europass Digital Credentials Infrastructure (EDCI)**: The EU has developed a framework to issue digitally signed credentials (like diplomas, certificates) in a standardized way. A few universities have started piloting issuing micro-credentials through EDCI, meaning a learner receives a credential file that can be verified and shared through the Europass portal. This is highly relevant for formal micro-credentials (with ECTS, EQF level) because it lends trust and uniformity. For example, a university in the MICROBOL project tested issuing a micro-credential certificate for a short course in this format. Such infrastructure might become the norm for cross-border recognition: imagine a farmer completes an online module from BOKU University, gets a signed digital credential which they can later present to a different institution or employer in another country, with confidence it will be understood and valued. (Brookings Institution 2024; EU-Conexus 2020)

Technical features – offline, SCORM, etc.: Mobile learning often requires coping with bandwidth and connectivity issues. Therefore:

- **Offline capability**: Platforms that allow content download (like Coursera, edX apps) or offline quizzes are preferred for reaching remote learners. Moodle's app, for instance, can cache pages and let users read them offline, syncing when back online. This can be a deciding factor when selecting a platform for an EU project that involves rural areas with patchy internet. The report's findings highlight that if a micro-credential is to be disseminated widely (including outside Europe to low-income regions, as in Activity 5.4), offline support is critical.

- **Standards (SCORM, xAPI)**: These are e-learning content standards that ensure interoperability. SCORM packages can run on any SCORM-compliant LMS, which means content developed by one partner can be used by another's system. For mobile, a newer standard, xAPI (Experience API or Tin Can API), might be more relevant as it can track learning experiences across platforms (for example, learning that happens on a mobile app and on a website can both be recorded). While these technical details were likely considered internally, the effect is that partners could compare LMS solutions for compatibility and ease of delivering content on mobile devices. An example might be: a micro-lesson created in an authoring tool (like Articulate Rise, which outputs responsive content) packaged as SCORM – it will play nicely on Moodle or TalentLMS on any device.

- **Accreditation and credit standards (ECTS, EQF)**: Many European micro-credentials now come with ECTS credits and an EQF level indication, thanks to the Common Microcredential Framework (CMF) which explicitly required it. The CMF says a micro-credential should be 100-150 hours (4-6 ECTS) at EQF level 6-8. FutureLearn's microcredentials adhered to this, offering 4-6 ECTS credit on average. This alignment is a tool in itself – it provides standardization. If an adult learner earns 5 ECTS from a micro-credential on mobile learning design, in theory they could apply those credits towards a degree in a European university (subject to acceptance by the institution). Tools like the European Credit Transfer System ensure that micro-credentials aren't just dead-end certificates but can plug into formal education pathways. Additionally, the EQF level communicates the learning depth (e.g., level 5 might be a technician level, 6 bachelor's, 7 master's). In our mapping, relatively few basic digital literacy courses have an explicit EQF level, since they are often below the threshold of higher education. But there are examples: the MICROHE project experimented with assigning EQF levels to all forms of micro-learning. It noted that many digital skills badges would be EQF 3-4

(upper secondary level competence). Having that clarity could help with recognition by vocational qualification frameworks. (George Ubachs 2020; FutureLearn 2020)

Validation and recognition tools: Beyond issuing credentials, *validation* refers to processes like RPL (recognition of prior learning) which we touched on. There are online tools emerging that help individuals compile and present their micro-credentials to get formal credit. For example, the Credential Wallet concept (pioneered by projects like Credentify or the ongoing work by the Europass platform) – a learner can import all their badges and certificates and then share a comprehensive profile with a university admissions office or employer. Some EU projects are testing such wallets with blockchain verification. For the learner, this might be a mobile app where they store credentials (like a digital wallet, similar to storing digital IDs). This is still early-stage, but in a few years an adult could have a "Skills Wallet" app containing their micro-credentials from various sources, ready to be validated by scanning a QR code. (Islam 2025)

In conclusion, the ecosystem of platforms and tools in Europe is quite advanced, leveraging both global and home-grown technologies to ensure micro-credentials are accessible, portable, and trustworthy. The choice of platform often dictates the level of mobile support: those known for MOOC delivery naturally excel at mobile user experience, while some traditional LMS required more tweaking for mobile (which has largely been achieved by now). The trend is clearly towards mobile-first design – meaning any new micro-credential content is designed considering that a significant portion of learners will engage via phones. This aligns perfectly with the objectives of USAGE-NG, which emphasizes mobile learning for flexibility and inclusion. By mapping the tools available, this report enables the project and others to select appropriate platforms (e.g., Moodle vs. proprietary LMS, or Coursera vs. a custom app) and to adopt standards that maximize reach and recognition (like Open Badges, ECTS credits).

5 Conclusion

This analysis has illuminated the current state of micro-credentials related to mobile learning, mobile digital skills, and e-literacy within Europe, against the backdrop of global developments. We found a dynamic but nascent landscape: numerous initiatives and courses have sprung up across different providers, yet they remain unevenly distributed and not fully integrated into the educational mainstream. The mapping in Section 3 demonstrated that there are indeed micro-credentials available for topics like mobile pedagogy and digital literacy – from university-led online modules for teachers, to badges for basic smartphone skills issued by community organizations. However, these offerings tend to be fragmented, often project-based, and concentrated in certain languages or regions, leaving significant gaps in coverage for specific audiences (such as farmers and low-skilled adults).

One overarching observation is the predominance of third-party and non-formal offerings in the digital skills space, as opposed to formally accredited micro-credentials from higher education institutions. Many basic e-literacy courses are run by NGOs, libraries, or networks like All Digital, reflecting agility in addressing immediate needs, but they often lack formal recognition (ECTS/EQF) that would enhance their portability. Conversely, universities have embraced micro-credentials more in advanced or professional domains (e.g., tech, business), with less focus so far on foundational digital

skills. This indicates an opportunity (and perhaps responsibility) for educational institutions to extend their micro-credential portfolio to include inclusive, entry-level digital competencies, leveraging their credibility to elevate those credentials' status. At the same time, non-traditional providers bring innovation – for example, using messaging apps or gamified mobile apps for microlearning – and partnerships between formal and non-formal sectors could yield powerful synergies. (European Commission 2020)

The platforms and tools reviewed highlighted that the technical infrastructure to deliver mobile learning micro-credentials is largely in place. Europe benefits from world-class MOOC platforms and widely used LMS solutions that are continuously improving mobile user experience. Standards like the Common Microcredential Framework and Open Badges provide blueprints for ensuring micro-credentials are rigorous and shareable. The fact that in 2025 there are thousands of micro-credentials listed globally– and that these can be accessed through smartphone apps – is encouraging for accessibility. Our research also underscored forward-looking developments: the push towards digital credential wallets and integration with Europass can streamline recognition, addressing some of the trust and transferability issues identified. In essence, the digital backbone is not the primary bottleneck; instead, the bottlenecks are more related to content relevance, awareness, and institutional uptake. (FutureLearn 2020; Pressbooks)

The analysis of gaps and needs makes clear that certain measures are necessary to fully realize the potential of mobile micro-credentials in Europe: - There is a need to broaden the thematic scope of micro-credentials, creating more offerings that cater to basic and sector-specific needs (such as agriculture, as per USAGE-NG's focus). This entails content development with contextualization in mind – ensuring that learners see direct value and relatability in what is taught. - Efforts should continue in harmonizing frameworks so that learners and employers find micro-credentials transparent and trustworthy. Implementing the Council Recommendation's vision – common standards for quality and transparency– will be key. As micro-credentials become more uniform in how they describe workload, level, and outcomes, they will more easily slot into lifelong learning pathways.

- **Bridging initiatives** are important: supporting learners with low digital readiness to engage with online learning. The best content is moot if the intended users can't navigate the platform or doubt their own ability to succeed. Thus, building digital confidence is part and parcel of promoting micro-credentials. This can be done through blended approaches where community educators guide learners initially, through user-friendly design on mobile platforms (many short courses now pay attention to UX, but it must remain a priority), and through peer support mechanisms (community forums, local study groups).

- **Policy and funding support** at the EU and national levels should incentivize the creation and uptake of micro-credentials that address public interest needs (like digital inclusion). The EU's digital education and skills policies already acknowledge micro-credentials as tools for upskilling the workforce and fostering equity. Translating that into funded programs, performance indicators (e.g., including micro-credential completion rates in skills agenda targets), and recognitions (like including certain micro-credentials in unemployment re-skilling schemes) will accelerate acceptance. (Islam 2025)

For the USAGE-NG project in particular, the findings of Activity 5.1 feed directly into the next steps. The database of existing courses and platforms compiled here (see Annexes) provides a starting point for designing the project's own mobile learning modules. It reveals "what's out there" and therefore helps in avoiding duplication and focusing on innovation. It also helps to identify best practices: for instance, if a certain platform or pedagogical approach appears successful (as evidenced by learner feedback or widespread adoption), the project can adopt similar strategies. Furthermore, this research highlights where USAGE-NG can add distinctive value – notably in creating micro-credentialed learning tailored to smallholder farmers and agricultural engineering students, a niche not well-served currently.

Activity 5.2, the Best Practice Guide, will benefit by inheriting the insights on gaps and success factors documented. This report's findings underscore the importance of including sections on institutional support, quality assurance, and learner engagement strategies in the Guide. Similarly, Activity 5.3 (pilot courses) will be informed by the specific platform evaluations – for example, if the research indicated that Moodle with certain plugins is optimal for low-bandwidth rural learners, the pilots can be implemented accordingly.

In closing, the evolution of micro-credentials in the EU is a story in progress. The concept aligns well with Europe's push for lifelong learning and digital transformation, but practice is still catching up to policy. Mobile learning, with its promise of breaking temporal and geographic barriers, will be a cornerstone of that transformation if the challenges outlined can be met. The results of this comparative analysis reaffirm that mobile micro-credentials are not a panacea by themselves but integrated into a supportive ecosystem – with user-centric design, robust validation, and inclusive outreach – they can significantly enhance access to skills and education. This holds special significance for those who stand to gain the most: individuals in remote, changing, or disadvantaged environments (like the small farmers adapting to digital farming) who require just-in-time learning opportunities. By continuing to research, collaborate, and implement with these principles in mind, educational stakeholders in Europe can ensure that the micro-credential movement contributes to a more equitable and skilled society, in which learning is truly lifelong and life-wide, accessible literally in the palm of one's hand. (European Commission 2022)

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