

Recommendations for 21st Teacher Competencies

21st Century European Teachers



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European
Teachers



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Executive Summary

This document presents recommendations for developing essential teacher competencies aligned with four emerging educational focus areas identified by the *21st Century European Teachers* project: **Technological Empowerment, Sustainable Learning, Entrepreneurship, and Playful Learning**. Rooted in European collaborative research and policy efforts, and informed by practices developed across five partner countries, the recommendations offer actionable strategies for cultivating adaptable, innovative, and future-ready educators.

Preparing teachers for the 21st century is not solely about acquiring new skills; it entails embracing new pedagogical mindsets, co-creating learning environments, and responding proactively to societal challenges. As climate change, digital transformation, and economic shifts reshape education systems, teachers need competencies that enable them to guide learners through uncertainty with creativity, responsibility, and confidence. The recommendations focus on four foundational areas that represent key leverage points where teacher competence can accelerate educational transformation across Europe:

- ▶ **Technological Empowerment – using digital tools purposefully** to enhance learning, foster collaboration, and design meaningful digital pedagogies that extend beyond tool use toward critical and creative engagement with technology.
- ▶ **Sustainable Learning – embedding sustainability principles** and the UN SDGs into teaching practice, promoting environmental awareness, and cultivating learners' capacity to address global challenges through informed action.
- ▶ **Entrepreneurship Education – fostering creativity, initiative, and problem-solving**, encouraging learners to engage in inquiry-based, real-world tasks that develop adaptability and agency.
- ▶ **Playful Learning – integrating exploratory, joyful learning approaches** that support curiosity, collaboration, and socioemotional development, while enabling deeper engagement with complex content.

Building on these areas, the document outlines practices for integrating these competencies into teacher education and professional development. These include creating learning environments that encourage experimentation, designing cross-disciplinary activities, and embedding co-creation processes — such as co-design, co-implementation, and co-evaluation — to ensure shared ownership and continuous learning.

Common challenges in implementing these competencies, such as uneven digital readiness, differing institutional priorities, and varying levels of sustainability literacy, are addressed through strategies that emphasize capacity building, collaborative problem-solving, and the development of strong international networks between teacher training institutions.

The recommendations stress the importance of ongoing monitoring and reflective practice to ensure alignment with evolving societal needs. Sustained impact requires embedding innovative teaching practices into institutional structures, supporting mobility and exchange opportunities, and designing flexible professional learning models that can scale across contexts.

Finally, the document highlights the need to begin with shared values, cultivate strong professional relationships, promote inclusive pedagogies, and view the development of teacher competencies as a long-term, collaborative learning journey. In doing so, it emphasizes that advancing 21st Century teacher competencies goes beyond updating curricula: it is about **empowering teachers to lead educational transformation** and equipping them to build resilient, imaginative, and ethically grounded learning communities across Europe.

Introduction

Teaching today means working in a world that changes quickly - socially, technologically, and environmentally. Because of this, teachers need more than traditional pedagogical skills. They need a mix of **technological fluency, sustainability awareness, entrepreneurial thinking, and playful, engaging teaching approaches**. These aren't "extra" skills. They are now essential for helping students thrive in a complex and uncertain future.

The *21st Century European Teachers* project identified these four key areas as core to future-ready teaching across Europe. This document builds on that work and turns those insights into practical recommendations that teachers, student teachers, and education stakeholders can use to support innovation, equity, and lifelong learning.

At its heart, this framework aims to **empower teachers** — to help you use digital tools responsibly, design learning that supports ecological and social responsibility, encourage initiative and adaptability, and use play and creativity to support students' overall development. These principles match the wider European vision for education as inclusive, future-focused, and responsive to changing societal needs.

21st Century competencies include skills and attitudes such as **critical thinking, creativity, collaboration, communication, digital literacy, global awareness, and socio-emotional intelligence** (Harju-Luukkainen et al., 2025). International frameworks like the **OECD Learning Compass** and **UNESCO's Futures of Education** emphasise that these competencies are essential for all learners, and especially for teachers, who must also model and nurture them in the classroom. This means that teacher preparation should intentionally develop these areas so educators can foster inclusion, guide innovation, and help learners navigate the demands of future societies.

For teachers, these competencies extend far beyond subject knowledge. Today, teachers are expected to be **reflective practitioners** who understand how to support diverse learners, manage complex classroom dynamics, and draw from different disciplines. To do this well, teachers need **pedagogical flexibility, cultural responsiveness, and a commitment to ongoing learning**. Research shows that the competencies teachers need evolve alongside shifts in society, technology, and education (Harju-Luukkainen et al., 2025; Kangas et al., 2024). This is why teacher preparation programs, both preservice and in-service, must include opportunities for **hands-on learning, co-creation, and regular reflection**.

To meet these expectations, teacher education programs across Europe must continue to evolve. When teacher learning aligns with 21st Century frameworks, educators are better equipped to support **equity, inclusion, and student agency**. The four domains in this document — technological empowerment, sustainability, entrepreneurship, and playful pedagogies — offer practical ways for teachers to bring these priorities into their everyday practice. This report builds on the foundation created by the *21st Century European Teachers* project and offers concrete strategies for strengthening teacher learning and innovation across Europe.

The project also highlights the importance of understanding teacher competencies (see also Ranta et al., 2023) at three levels:

- ▶ **Meta-competencies:** deep thinking, theory, and curriculum knowledge.
- ▶ **Professional competencies:** planning, assessment, and learning environment design.
- ▶ **Practical competencies:** everyday interaction, communication, and responsiveness.

For example, a teacher's practical competence might involve adjusting a lesson in the moment to match students' interests or using dialogue to support peer learning. This three-level structure shows how theoretical understanding links to planning and how planning links to everyday teaching.

Across the four domains, teachers can develop competencies such as:

- ▶ **Technological Empowerment:** understanding the ethics of digital tools, designing tech-rich lessons, and supporting online collaboration.
- ▶ **Sustainable Learning:** applying the UN SDGs, designing sustainability projects, and guiding student-led environmental actions.
- ▶ **Entrepreneurship:** using real-world tasks, encouraging student agency, and supporting creative problem-solving.
- ▶ **Playful Learning:** using storytelling, games, and roleplay to deepen socio-emotional and academic learning.

What does research say about the future of teacher education?

Recent studies show that preparing teachers for the future requires more than learning techniques —it requires rethinking how the profession is supported (Harju-Luukkainen et al., 2025). Future teacher education must embrace **complexity, equity, and adaptability**, moving beyond narrow lists of competencies toward a **holistic approach** that recognizes the social, cultural, and ecological dimensions of learning (Kangas et al., 2024). Research on blended learning also highlights the value of **flexible formats** that meet the needs of adult learners and strengthen their sense of professional agency (Ranta et al., 2025).

A key finding is that teacher education plays a crucial role in shaping **sustainable futures**. Teachers must be prepared to engage with global challenges like climate change, digital transformation, and social inequality —always working with ethical awareness and reflective practice (Harju-Luukkainen et al., 2025). Education systems increasingly recognise that teachers need **transversal competencies** that cross subject boundaries, including creativity, collaboration, and innovation (Niemi et al., 2024).

Research also emphasises the importance of **partnerships and relationships** in teacher preparation (Paz-Albo et al., 2022). Becoming an effective teacher involves learning to work closely with families, communities, schools, and policy environments. **Relational competence** —the ability to build trust, navigate cultural differences, and co-create learning with others— has become a foundational skill for the profession (Kangas et al., 2024). The *21st Century European Teachers* project supports this through coteaching, collaborative design experiences, and mobility opportunities (Kessler et al., 2026).

Finally, future-ready teacher education highlights the importance of **teacher agency**. Teachers are not just implementers of curriculum —they are **knowledge creators, designers of learning, and changemakers**. Through MOOCs, co-creation labs, and international collaboration, the *21st Century European Teachers* project encourages student teachers and practising educators to explore new pedagogies and strengthen their professional identity as reflective and creative practitioners (Ranta et al., 2025; Niemi et al., 2024).

In today's rapidly changing world, the role of teachers is more important than ever. Educators shape meaningful learning experiences, support student wellbeing, and help communities adapt and grow. Looking forward, teacher education must prioritize **future-oriented** —rather than past-oriented— skills, knowledge and competencies. Key areas of development include:

- ▶ Integrating artificial intelligence and digital technologies into teacher preparation.
- ▶ Strengthening teacher professional identity, wellbeing, and retention.
- ▶ Advancing equity, social justice, and culturally responsive pedagogy.
- ▶ Expanding practice-based and clinically rich teacher education models.
- ▶ Promoting new forms of teacher professionalism grounded in autonomy, collaboration, and research-informed practice.

The competencies in this document are not fixed requirement. Instead, they are **flexible pathways** to explore throughout your teaching career. Whether you are beginning your journey as a student teacher or already experienced in the classroom, this framework invites you to connect with others, try new approaches, and contribute to a shared vision of inclusive, creative, and sustainable education.

The invitation is open: **engage with these ideas, adapt them to your context, and help shape the future of learning.**

Technological Empowerment in Education

Technological empowerment in education refers to using digital tools in ways that genuinely **improve teaching and learning**, widen access to educational opportunities, and strengthen student engagement and achievement. Rather than focusing only on devices or connectivity, it emphasizes how technology can enhance pedagogy and help learners develop the **skills they need to succeed** in a fast-changing world.

In today's tech-driven society, empowerment also means ensuring that students and educators can participate confidently and safely in digital environments. This includes providing access to appropriate tools and platforms, but also ensuring people know how to use them effectively, responsibly, and ethically. In education, technological empowerment therefore involves integrating digital resources into the curriculum in ways that **improve learning experiences** and outcomes, not simply adding technology for its own sake.

This topic connects strongly with **UNESCO's Sustainable Development Goal 4**, which promotes inclusive and equitable quality education and lifelong learning for all. Seen through this lens, technological empowerment is not a luxury but a matter of **educational justice**: it supports equity, inclusion, and relevant skills development for work and global citizenship. Importantly, a holistic perspective is needed—real empowerment emerges at the intersection of **access, pedagogy, equity, and ethics**, not from infrastructure alone.

Access to technology is the starting point, but it is also complex. Beyond physical access to devices and internet, learners need the **social and cultural conditions** to use technology meaningfully. The persistence of the **digital divide**—both in access (devices, connectivity, learning spaces) and in skills—became especially visible during the COVID19 pandemic, when unequal home conditions and unreliable internet significantly affected participation and outcomes. Addressing access requires sustained investment, community partnerships, and recognition that digital infrastructure is now as essential as textbooks and classrooms.

Digital literacy is equally crucial and goes far beyond basic computer use. Students must learn to evaluate the credibility of online information, understand how algorithms influence what they see, create and communicate effectively through digital media, and navigate online spaces safely. The spread of generative AI adds urgency: learners need to understand how AI-generated content can be misleading, how to use AI ethically, and how to maintain critical judgment. For teachers—both student teachers and experienced professionals—this means embedding digital literacy across subjects rather than treating it as a standalone skill

Technology also brings powerful opportunities for personalised and collaborative learning when guided by strong pedagogy. Adaptive platforms can support different learning paces and provide timely feedback, but they are most effective when teachers use the data thoughtfully and maintain **professional agency** rather than relying on automated decision-making. At the same time, digital tools enable collaboration beyond classroom walls through shared workspaces, co-writing platforms, and online projects, but students need explicit support to develop **digital communication skills**, manage teamwork, and work productively across time and space.

Finally, technological empowerment depends on teachers' **ongoing professional learning** and on ethical, inclusive implementation. Effective professional development is sustained and practical, helping educators' experiment, reflect, collaborate, and adapt to emerging tools such as AI, AR/VR, or new learning platforms. At the same time, empowerment must not deepen inequalities or compromise wellbeing: schools must design accessible learning experiences, address bias and cultural representation, protect privacy, and teach digital citizenship in developmentally appropriate ways. With thoughtful, equity-centred practice that keeps pedagogy and student wellbeing at the centre, technology can help learners not only use digital tools, but also think critically about them, create meaningfully with them, and participate fully in digital societies.

Core Competencies

Preparing teachers for the digital age requires a holistic set of competencies that extend far beyond technical know-how. Educators must develop strong **digital literacy and technical proficiency** to navigate tools confidently and safely, while also mastering the **pedagogical integration of technology**, ensuring that digital resources meaningfully support learning goals. Alongside this, teachers need **critical digital literacy and citizenship**, helping students evaluate information, behave ethically online, and understand the wider digital world. Today's classrooms also rely on **collaboration and networked learning**, where digital tools connect students, educators, and communities in new ways that foster shared knowledge and innovation. At the same time, teachers are called to nurture **creativity, innovation, and problem-solving**, using technology for design thinking, STEAM exploration, and hands-on experimentation. Finally, as AI and data become increasingly present in education, teachers must cultivate **AI literacy, data-informed practice, and ethical digital leadership**, modelling responsible use while protecting students' wellbeing and guiding school communities through ongoing digital transformation.

► Digital Literacy and Technical Proficiency

Teachers need strong digital skills to navigate devices, learning platforms, cloud storage, and collaborative workspaces with ease. This includes basic troubleshooting, understanding digital safety, and managing data responsibly. Frameworks like **DigCompEdu** and **UNESCO's ICT Competency Framework** stress that effective educators use technology confidently, critically, and ethically to support both learning and digital wellbeing.

► Pedagogical Integration of Technology

Technology should always serve pedagogy. Teachers thoughtfully select and use digital tools that align with curriculum goals and enhance learning rather than distract from it. Approaches like **TPACK** highlight the importance of blending content, pedagogy, and technology into cohesive learning experiences, whether in blended, hybrid, or traditional classrooms.

► Critical Digital Literacy and Citizenship

Critical digital literacy involves helping students' question, analyse, and understand the digital world. Teachers guide learners to evaluate online information, spot misinformation, and behave responsibly in digital spaces. Frameworks such as **DigComp** and the **Council of Europe's Digital Citizenship Education** underline the need to develop informed, ethical, and empowered digital citizens.

► **Collaboration and Networked Learning**

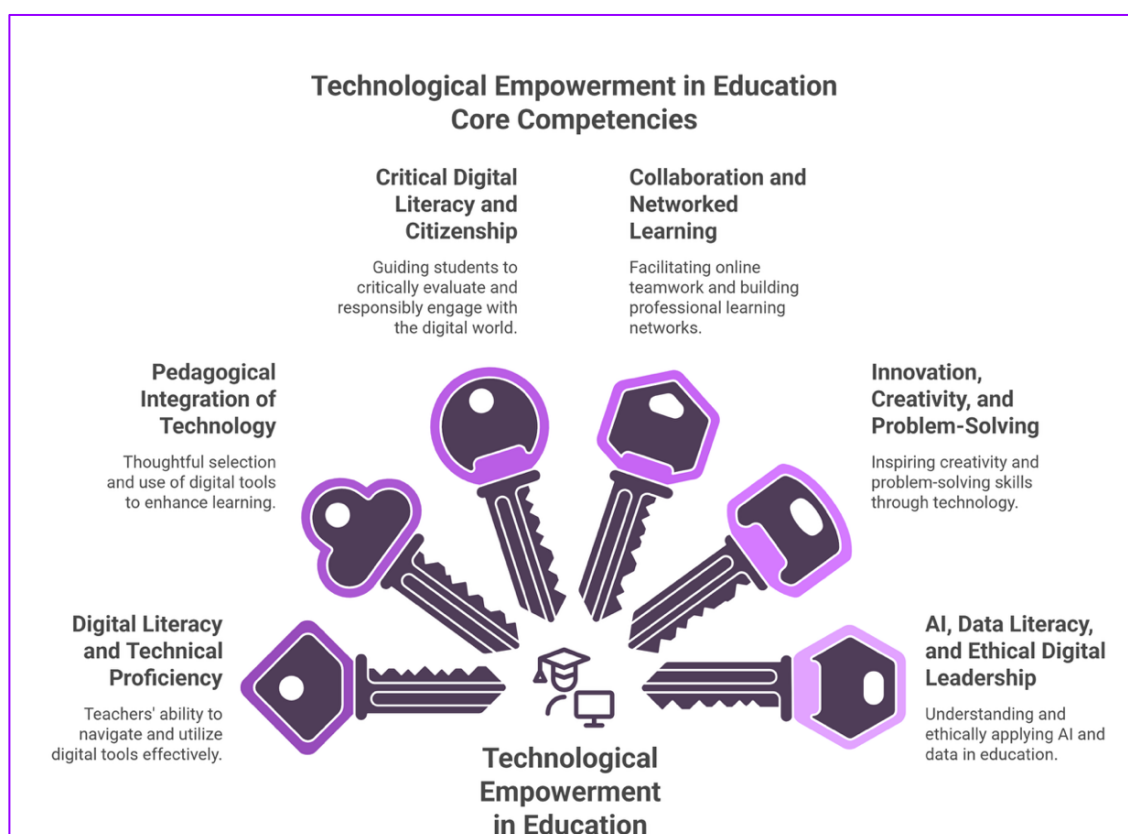
Digital tools open new opportunities for collaboration among students, educators, families, and broader communities. Teachers facilitate online teamwork, build communities of practice, and participate in professional learning networks. According to **DigCompEdu**, engaging in digital collaboration strengthens innovation, enriches teaching practices, and supports ongoing professional growth.

► **Innovation, Creativity and Problem-Solving**

Educators use technology to inspire creativity, support design thinking processes, and cultivate problem-solving skills. Maker-activities, STEAM-projects, prototyping, and computational thinking all help students explore ideas and develop innovative solutions. Research and frameworks like **TPACK** and **DigCompEdu** encourage teachers to experiment, iterate, and embrace creative approaches to digital teaching.

► **AI, Data Literacy and Ethical Digital Leadership**

Teachers increasingly need a basic understanding of AI, learning analytics, and the ethical implications of technology in education. This means recognising appropriate uses of AI tools, analysing learning data responsibly, and protecting student privacy. Frameworks such as **UNESCO's AI Competency Framework** and **DigCompEdu** emphasise that educators also act as leaders — modelling ethical choices, advocating for equity, and guiding school communities through digital transformation.



Recommendations

Romanian in-service teachers participating in the *21st Century European Teachers* project recommend orienting **pre-service and in-service training** around a **pedagogy-first**, start-small mindset. Begin with a **context audit**: inventory devices, connectivity, platforms, and **BYOD** policies, then identify one objective where technology clearly adds value. Align planning to **national frameworks** and competency standards (e.g., **DigCompEdu**). Rehearse a **5-step routine** via microteaching: choose the objective; pick one tool and use it consistently; scaffold with concise instructions and modelling; evaluate effects on learning and inclusion; refine using feedback. In practicum or mentoring, pilot with a **receptive class** and use **early-win** designs, project-based- learning, simulations, and multimedia storytelling — always keeping technology in service of learning goals.

Embed **sustained support** into coursework and placements: join teacher networks/communities of practice, curate **open educational resources**, and use **MOOCs** —prioritizing **free, interoperable tools**. Design assignments that anticipate constraints: prepare **offline/low bandwidth** plans and **analog backups**; map tech enhanced tasks to practice relevant skills for **exam-focused** contexts; craft **communication** artifacts (family briefs, alignment notes, evidence of progress). Teach **digital literacy** explicitly (credibility, citation, productivity suites, digital citizenship and ethics), apply **data protection** practices within managed ecosystems (e.g., Microsoft 365 or Google Workspace), and use **language aware** strategies—local language support.

Build your skills by collaborating with others through **coaching, lesson study, and peer triads**, and show what you can do by developing a **competency-aligned portfolio** in pre-service programs or by engaging in short, focused **improvement cycles** during in-service work to test small, measurable changes. Gather simple **evidence of impact** (student work and quick surveys) and share results in team meetings or workshops. Promote equity by making good use of in-class time, ensuring access to **library and lab** spaces, offering **phone-optimized alternatives**, and using **assistive technologies** within a UDL framework. Stay **practical** by choosing free tools, documenting how each one supports learning goals, starting with small pilots that can grow over time, and approaching your work as a **pedagogical designer** who introduces, evaluates, and sustains integration.

For Pre-Service Teachers:

- ▶ **Complete the Technological Empowerment in Education MOOC** to build a solid foundation in educational technologies: <https://21centuryeuteachers.eun.org/tech-empowerment-in-education-mooc>
- ▶ **Adopt a pedagogical-first mindset**, selecting technologies that meaningfully support learning objectives.
- ▶ **Develop strong digital literacy skills**, becoming confident with digital platforms, communication tools, and basic EdTech applications.
- ▶ **Evaluate and choose appropriate technologies**, considering accessibility, ethics, privacy, and alignment with learning goals.
- ▶ **Integrate multiple digital tools coherently**, designing student centred activities that promote creativity and active learning.

- ▶ **Use technology to enhance student agency**, encouraging autonomy, collaboration, and critical thinking.
- ▶ **Build a personal learning network (PLN)** to stay updated, share resources, and engage in continuous professional learning.

For In-Service Teachers:

- ▶ **Complete the Technological Empowerment in Education MOOC** to refresh and update knowledge on technology integration: <https://21centuryeuteachers.eun.org/tech-empowerment-in-education-mooc>
- ▶ **Purposefully select and embed digital tools** to enrich lessons, support diverse learners, and meet curriculum goals.
- ▶ **Use digital assessment tools and learning analytics** to monitor student progress and provide meaningful feedback.
- ▶ **Design inclusive and equitable digital learning experiences**, addressing accessibility and cultural responsiveness while reducing the digital divide.
- ▶ **Facilitate collaborative digital learning**, guiding students in teamwork, co-creation, and peer-supported learning.
- ▶ **Experiment with emerging technologies** —such as AI, VR/AR, or gamification— while modelling ethical and responsible use.
- ▶ **Engage in continuous professional learning**, including action research, sharing practices with colleagues, and staying informed about new developments in EdTech.
- ▶ **Reflect systematically on your digital skills and digital teaching practice** by using the [SELFIE for Teachers tool](#), helping you identify strengths and areas for further professional development.

Sustainability in Education

Sustainability in education refers to the **ability of educators to integrate environmental, social, and economic principles** into teaching to equip learners with the knowledge, skills, and values needed to act as informed and responsible global citizens. It emphasizes not only knowledge, but also **values, skills, and agency**, enabling learners to understand and address the interconnected challenges of the 21st century. For educators, this approach strengthens **professional growth** and aligns teaching with current global demands.

Throughout history, sustainability has been defined in multiple ways, but the most widely cited definition comes from the **1987 Brundtland Commission: meeting present needs without compromising the ability of future generations to meet theirs**. This definition highlights a **long-term, intergenerational perspective** and underscores the importance of preserving natural, social, and economic systems. As such, sustainability requires **careful and responsible decision-making** that acknowledges the finite nature of resources.

A common way to understand sustainability is through the **“three pillars” model —environmental, economic, and social sustainability—** each supporting the overall balance needed for long-term wellbeing. Complementing this, perspectives such as **ecological footprints and handprints** emphasize the role of **individual actions**: while footprints measure negative impact, handprints capture positive contributions to sustainability. These models help teachers and learners reflect on how **personal and collective choices** affect the planet. They also serve as accessible pedagogical tools in classroom discussions, project-based learning, and whole-school approaches to sustainability.

More recent frameworks, such as **Kate Raworth’s “doughnut model”**, expand the definition of sustainability by linking **ecological limits** with **social foundations**. The model highlights that humanity must live within **planetary boundaries** while ensuring access to essential needs such as **health, education, and equity**. For educators, this visual and conceptual approach offers a powerful way to teach **systemic thinking, interdependence, and global justice**.

Understanding sustainability also involves recognizing its **benefits and challenges**. Environmentally, it helps preserve **ecosystems and biodiversity**; economically, it encourages **innovation and long-term resilience**; and socially, it promotes **equity and wellbeing**. At the same time, sustainability requires navigating **complex systems**, reconciling competing interests, and fostering **new competencies** —areas emphasized by the **EU, OECD, and UNESCO**. Teachers play a critical role in developing these competencies among learners. Embedding sustainability in teacher education therefore contributes directly to Europe’s broader green and digital transitions.

Finally, it is important to debunk common misconceptions: sustainability is **not only about the environment**, but recycling alone is also **not enough**, and **individual actions truly matter**. Sustainable living does not mean sacrifice; it often brings **health, economic, and social benefits**. Despite criticism and the challenges of implementation, sustainability remains **essential**. It is an evolving, collaborative process that calls for **innovation, leadership, and continuous improvement** — qualities that teachers can model and cultivate in their students. A whole-school and whole-community approach further strengthens long-term impact and supports shared responsibility.

Core Competencies

Preparing learners for a sustainable future requires teachers to develop a holistic set of competencies that integrate sustainability into everyday educational practice. This begins with a strong **understanding of the UN Sustainable Development Goals (SDGs)** and the principles of **Education for Sustainable Development (ESD)**, recognising sustainability as a crosscutting dimension of quality education rather than a separate subject. Teachers must be able to **design sustainability-focused curricula** that weave environmental, social, and economic perspectives into learning goals, classroom activities, and authentic, inquiry-based projects. At the same time, educators play a crucial role in **promoting ecological awareness, agency, and action**, helping students explore issues such as biodiversity, circular economy, and social justice while empowering them to lead initiatives that make a meaningful difference in their schools and communities. Finally, addressing today's complex global challenges requires **interdisciplinary teaching**, where learning is organised around real-world problems rather than isolated subjects, fostering creativity, collaboration, and critical problem-solving. Together, these competencies enable teachers to guide students in understanding interconnected global issues and taking informed, responsible, and collaborative action toward a more sustainable world.

► **Understanding of the UN SDGs and ESD**

Teachers need a strong understanding of the **UN SDGs** and the principles of **ESD**. This competency means recognising that sustainability is not a separate subject, but a thread woven throughout quality education. Educators help learners develop the knowledge, skills, values, and agency needed to make informed choices and take meaningful collective action for a sustainable future. By understanding the 2030 Agenda, teachers can guide students in connecting global challenges —such as climate change, inequality, and responsible consumption— to their own lives and communities.

► **Ability to Design Sustainability Focused Curriculum and Learning Experiences**

This competency involves integrating environmental, social, and economic perspectives into everyday teaching. Teachers design learning goals, activities, and assessments that promote responsibility, ethical reasoning, and long-term thinking. Sustainable curricula help learners see the impact of their choices and understand real-world issues through authentic projects and inquiry-based learning. By embedding sustainability across subjects —rather than treating it as an add-on— teachers support meaningful learning that reflects the complexity of today's world.

► **Promotion of Ecological Awareness, Agency, and Action**

Teachers play a key role in cultivating learners’ curiosity and critical thinking about sustainability. This means helping students engage with concepts like biodiversity, circular economy, resource stewardship, and social justice. More importantly, sustainability education should empower students to take action —through initiatives such as eco-clubs, school-wide campaigns, or community projects. Educators influence not only their students’ attitudes but also those of families and local communities, making sustainability a shared responsibility and fostering lifelong engagement with global and local challenges.

► **Interdisciplinary Teaching for Complex Global Challenges**

Sustainable futures require thinking that crosses traditional subject boundaries. This competence involves using **interdisciplinary approaches** that bring together different perspectives, methods, and types of knowledge to address real-world challenges such as climate change, inequality, or technological transformation. By designing learning around shared problems rather than isolated subjects, teachers support collaboration, creativity, and critical problem-solving. Interdisciplinary teaching helps students understand that global challenges are interconnected —and that meaningful solutions require knowledge from multiple fields working together.



Recommendations

Danish in-service teachers involved in the in the *21st Century European Teachers* project recommend beginning sustainability work by drawing on the experience and knowledge already present in schools. They suggest consulting colleagues who have previously implemented sustainability-focused lessons, exploring existing school projects, and reaching out to teacher-education experts for additional ideas and pedagogical frameworks. Starting with small, manageable steps —such as linking sustainability topics to students’ everyday lives— helps make the learning relevant and achievable. For those preparing to teach, this approach reinforces the importance of grounding sustainability in authentic, meaningful contexts rather than treating it as an add-on.

The teachers also emphasize the value of involving **students, families, and the local community** as co-creators of sustainability initiatives. Student-teachers and teacher educators can learn from this collaborative mindset by designing activities where children help generate ideas for action plans or identify sustainability needs within their own environments. Parents and community partners often bring practical suggestions and support that enrich classroom learning. Importantly, Danish teachers note that no aspect of sustainability is too small —simple actions, such as waste sorting, matter and are often highly visible to children. For those preparing future teachers, this highlights the need to cultivate attentiveness to everyday practices and to model how even modest initiatives can contribute to a broader culture of sustainability.

For Pre-Service Teachers:

- ▶ **Complete the Sustainability in Education MOOC** to build a solid foundation in Education for Sustainable Development (ESD): <https://21centuryeuteachers.eun.org/sustainability-in-education-mooc>
- ▶ **Explore cross-national case studies** to understand how different school systems integrate sustainability and to broaden your pedagogical perspective.
- ▶ **Use the TEACH4SD ESD Academy for inspiration:** <https://academy.teach4sd.eu/> —this platform offers free courses and practical resources to help future educators design meaningful ESD learning experiences.
- ▶ **Integrate sustainability themes across existing subjects** to strengthen learners’ ability to link environmental issues, ethical reasoning, and social responsibility to curricular content.
- ▶ **Design small cross-curricular activities or projects** that address real sustainability challenges, encouraging students to think critically and act locally.
- ▶ **Support student-led initiatives**, such as eco-clubs, recycling campaigns, or energy-saving actions, to empower learners and promote civic engagement.
- ▶ Collaborate with local communities, municipalities, organisations, and NGOs to create place-based learning that links global sustainability goals with local realities.

For In-Service Teachers:

- ▶ **Complete the Sustainability in Education MOOC** to update or deepen your understanding of sustainable practices in teaching: <https://21centuryeuteachers.eun.org/sustainability-in-education-mooc>
- ▶ **Use the TEACH4SD ESD Academy** as a professional learning resource to support curriculum design, interdisciplinary activities and continuous professional development.
- ▶ **Embed sustainability across subjects** to connect environmental stewardship, ethical reasoning, and social justice with your disciplinary content, helping students understand sustainability as relevant to their everyday lives and future professions.
- ▶ Develop cross-curricular sustainability projects through collaborative planning, ensuring holistic and coherent learning experiences that transcend subject boundaries.
- ▶ **Facilitate and mentor student-led sustainability actions** that foster leadership, autonomy, and community engagement.
- ▶ **Strengthen partnerships with local communities, municipalities, and NGOs** to create experiential learning opportunities and connect classroom learning with real-world impact.
- ▶ Model sustainable practices in your own teaching —such as responsible resource use, inclusive classroom practices, and participation in whole-school initiatives— to demonstrate sustainability as an everyday practice.

Entrepreneurship in Education

Entrepreneurship can be understood as a set of attitudes and transferable skills applicable to everyday life, including creativity, innovation, initiative, risk management, and the ability to plan and implement projects to achieve specific goals. **Entrepreneurial pedagogy**, rooted in social constructivism, emphasizes learner agency, intrinsic motivation, and authentic learning experiences. In education settings, entrepreneurship involves teaching and learning processes that support students in generating, developing, and implementing new ideas. It extends beyond business-oriented competencies to cultivate a creative and problem-solving mindset essential across diverse contexts.

Within this field, the terms **enterprise education** and **entrepreneurship education** are most commonly used. More recently, the broader concept of entrepreneurial education has emerged as an umbrella term that brings both ideas together. For teachers —whether pre-service or in-service— entrepreneurial education is increasingly recommended from the earliest stages of schooling so that children gradually develop entrepreneurial attitudes and skills as they progress through their education. Its purpose is to help learners become proactive, opportunity-oriented, and adaptable —qualities that enable them to thrive and contribute meaningfully in a constantly changing world.

Entrepreneurship in education represents a transformative approach that equips students with the mindset, skills, and knowledge needed to innovate and create value. For in-service teachers, pre-service teachers, and teacher educators, integrating entrepreneurial principles into the curriculum involves promoting creativity, critical thinking, and problem-solving abilities among learners. This approach prepares students to navigate the complexities while empowering them to become proactive individuals capable of identifying opportunities and driving positive change. Through entrepreneurship in education, teachers can inspire learners ready to confront real-world challenges with confidence, ingenuity and social responsibility.

In practice, **entrepreneurship in education** refers to intentionally designing learning experiences that help students create value in social, cultural, and economic contexts. For educators, this means fostering five core competencies: creativity, critical thinking, problem-solving, initiative, and innovation (Lackéus, 2015).

Ultimately, entrepreneurship in education plays a vital role in preparing today's learners for an evolving society. By integrating entrepreneurial thinking into everyday classroom practice —regardless of subject area— teachers can move beyond traditional instruction to cultivate creativity, adaptability, and student agency. This approach empowers learners to become innovative thinkers who can identify opportunities and turn ideas into action. For teachers, it enhances instructional practice by strengthening student engagement, promoting authentic learning, and supporting meaningful skill development.

For both student teachers and practicing educators, embracing entrepreneurial education not only enhances students' employability but also nurtures resilience, lifelong learning, and positive social impact. In doing so, teachers contribute to shaping a new generation capable of driving innovation, economic growth, and community wellbeing.

Core Competencies

Developing entrepreneurial competencies in education means equipping teachers with the mindset and skills needed to navigate complexity, foster innovation, and prepare students for an everchanging world. This begins with cultivating an **entrepreneurial mindset and strong problem-solving abilities**, enabling educators to identify opportunities, take initiative, and design creative responses to classroom and institutional challenges. It is supported by **project-based learning and innovation**, where teachers design authentic, interdisciplinary projects that encourage students to think critically, collaborate, and connect learning to real life contexts. Effective entrepreneurship education also relies on **collaboration and leadership**, empowering teachers to work within professional learning communities, share best practices, inspire colleagues, and guide students with confidence and ethical responsibility. Finally, **financial and digital literacy** help educators manage resources, integrate technology meaningfully, and promote responsible, future-ready skills among learners. Together, these competencies empower teachers to create dynamic learning environments that nurture agency, creativity, and practical problem-solving for both students and the wider school community.

► **Entrepreneurial mindset and problem-solving**

An entrepreneurial mindset in education encourages teachers to be proactive, innovative, and solution-oriented when facing classroom and institutional challenges. It involves identifying opportunities, taking calculated risks, and creating value through new teaching strategies or learning experiences. Problem-solving complements this by equipping educators with the ability to analyse complex situations, generate creative solutions, and adapt to changing circumstances. Together, these competencies empower teachers to lead transformative practices that prepare students for dynamic, real-world environments.

► **Project-based learning and innovation**

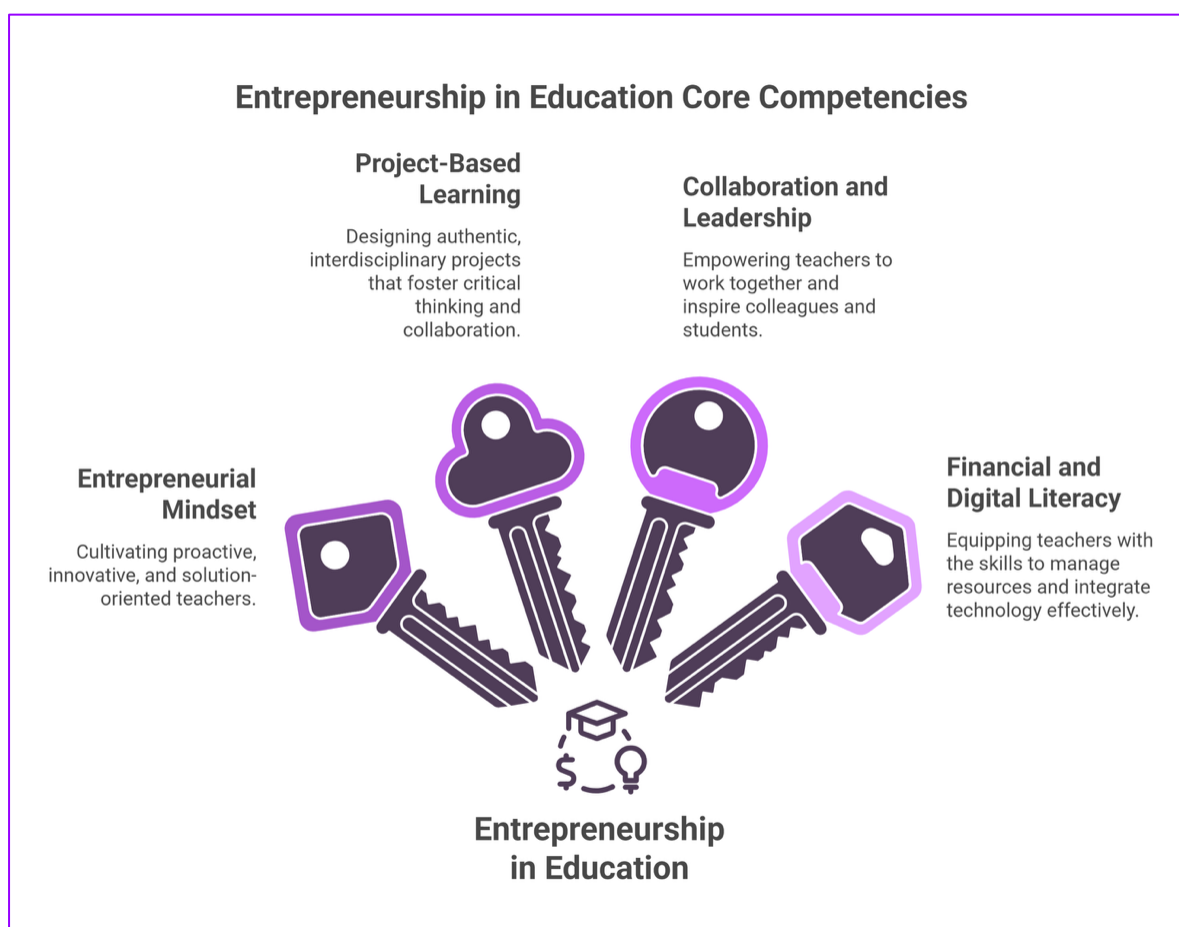
Project-based learning (PBL) fosters sustainable learning by engaging students in authentic, interdisciplinary tasks that require collaboration, critical thinking, and creativity. For educators, mastering PBL means designing meaningful projects that connect curriculum content to real-life contexts, encouraging innovation and active participation. This competency helps teachers move beyond traditional instruction, promoting deeper understanding and equipping learners with skills essential for the 21st century, such as adaptability and problem-solving.

► **Collaboration and leadership**

Collaboration and leadership are fundamental for creating inclusive and effective learning environments. Teachers who excel in these areas can work within professional learning communities, share best practices, and lead initiatives that enhance educational quality. Leadership does not only mean formal roles; it also involves inspiring colleagues, guiding students, and fostering a culture of trust and shared responsibility. These competencies ensure that educators contribute to systemic improvement while modelling teamwork and ethical decision-making for their learners.

► **Financial and digital literacy**

Financial and digital literacy are increasingly critical for educators in a technology-driven and economically interconnected world. Financial literacy enables teachers to understand resource management, budgeting for projects, and guiding students toward responsible economic behaviours. Digital literacy ensures educators can effectively integrate technology into teaching, evaluate digital tools, and promote safe, ethical online practices. Together, these skills empower teachers to navigate modern challenges, enhance learning experiences, and prepare students for future careers.



Recommendations

Spanish in-service teachers participating in the *21st Century European Teachers* project highlight that introducing entrepreneurship in the classroom should begin gradually, focusing on developing **entrepreneurial attitudes** rather than treating it as a separate content area. Teachers are encouraged to foster **initiative, creativity, decision making, and teamwork** through real and meaningful situations connected to students' daily lives. A good starting point is to design **small projects or challenges** based on students' interests and linked to the curriculum, without needing to create entirely new content. This approach can begin even in the **early years of primary education**, inviting students to generate ideas from scratch and explore them creatively.

To enrich these initiatives, teachers can look for inspiration in **colleagues' experiences, schoolwide projects, educational networks, blogs, institutional resources**, and structured programmes such as **Erasmus+**, which has brought valuable ideas to schools. Important aspects not to overlook include **teacher guidance**, adequate time for the process, viewing **mistakes as learning opportunities**, sustaining student motivation, and ensuring **coordination among teachers** to guarantee coherence and continuity. Above all, the **most crucial factor** for successful implementation is strong and ongoing **teacher training in entrepreneurship education**.

For Pre-Service Teachers:

- ▶ **Complete the Entrepreneurship MOOC** to build a solid foundation in entrepreneurship education: <https://21centuryeuteachers.eun.org/entrepreneurship-in-education-mooc>
- ▶ **Participate in co-creation labs** where they can collaboratively design and test ideas related to entrepreneurial learning.
- ▶ **Create engaging, real-world learning tasks** from quick problem-solving challenges to mini-projects and beginner-level business or social-innovation scenarios to help students apply their ideas in authentic ways.
- ▶ **Develop mentoring skills** to support students through brainstorming, project planning, and early-stage execution.

For In-Service Teachers:

- ▶ **Complete the Entrepreneurship MOOC** to refresh or strengthen theoretical knowledge: <https://21centuryeuteachers.eun.org/entrepreneurship-in-education-mooc>
- ▶ **Integrate entrepreneurial thinking into existing subjects** (e.g., STEM projects, arts-based creations, or humanities challenges) to make it part of everyday teaching practice.
- ▶ **Collaborate with local businesses, community organisations, or innovation hubs** to offer authentic, real-world learning experiences.
- ▶ **Promote student agency** by facilitating student-led initiatives, or small social innovation projects.
- ▶ **Deepen your expertise** through continuous professional development—some teachers may also contribute as **guest lecturers** (see <https://vcplis.com/book/> for an example from the Entrepreneurship MOOC).

Playful Learning in Education

Playful learning is an educational approach that integrates play into the learning process, offering an alternative to traditional methods that rely heavily on direct instruction and memorisation. Instead of passively receiving information, learners explore, experiment, and discover through play. This approach draws on children's natural curiosity and creativity, transforming learning into an enjoyable, engaging, and meaningful experience. By embedding play into everyday practice, teachers create environments where learners willingly take part because they are motivated by joy, interest, and a sense of agency.

At its core, **play is a voluntary and enjoyable form of active engagement**, often involving imagination, creativity, and problem-solving. It can be expressed in different ways — from free play, where learners freely explore, to guided play, where adults set goals but allow children to make their own choices, and structured play, which includes clear rules and objectives. Playful learning combines these forms strategically to support both autonomy and instructional goals, ensuring a balance between freedom and structure.

Playful Learning is increasingly understood as a **systematic pedagogical approach**, not an additional activity. It creates learning environments that promote curiosity, imagination, and active participation across cognitive, social, and emotional domains. Through play, learners engage in exploration and problem-solving, while teachers provide guidance that supports agency and collaboration. Joy and involvement are seen as essential conditions for deep learning and the development of skills relevant to contemporary education.

From a theoretical standpoint, playful learning is a **purposeful integration of play into educational practices** to support learning, development, and wellbeing. Sociocultural perspectives highlight that play is a dialogical and social process in which imagination, interaction, and exploration converge. Knowledge is constructed through participation and shared meaning-making. This view positions playful learning as a powerful medium for developing transversal skills such as communication, collaboration, creativity, and adaptability — all essential competencies for navigating complex and rapidly evolving futures.

Another crucial element of playful learning is its **intrinsic motivation**. Play is enjoyable, fosters emotional engagement, and supports sustained attention. This challenges narrow views of learning that prioritise efficiency over engagement and instead invites teachers to consider how joy and curiosity can coexist with curricular demands. Teachers learn to balance structure and freedom, allowing students to make choices, negotiate ideas, and experience ownership. As research shows, play strengthens problem-solving, self-regulation, and resilience — key qualities for lifelong learning.

Finally, playful learning holds strong relevance for **teacher education**. Future teachers must learn to design environments where play acts as both method and mindset, cultivating creativity, collaboration, and innovation. This requires training that allows teachers to experience playful learning themselves through design challenges, case studies, and reflective practice. As education increasingly values adaptability and creative thinking, playful learning offers a holistic and future-oriented pathway for responding to the evolving demands of schools and society.

Core Competencies

Playful learning invites teachers to create environments where exploration, creativity, and emotional growth are central to the learning process. It begins **with integrating play as a purposeful pedagogical strategy**, using hands-on activities, games, and playful challenges to deepen understanding and spark joyful engagement. This approach is strengthened by **fostering creativity and imagination**, encouraging students to experiment, generate ideas, and explore multiple solutions. At the same time, playful learning supports **emotional and social development**, offering children safe opportunities to collaborate, communicate, negotiate, and develop empathy through shared play. For these experiences to flourish, teachers must **create safe, inclusive, and encouraging spaces** where all learners feel valued, confident, and able to take risks. Finally, playful learning includes **authentic, playful assessment**, using observation, creative tasks, and performance-based activities to gain insight into students' thinking in natural and meaningful ways. Together, these competencies help educators design learning that is joyful, inclusive, and deeply supportive of children's holistic development.

▶ Integrating Play as a Pedagogical Strategy

Integrating play as a pedagogical strategy means using play intentionally to support exploration, problem-solving, and active engagement. Teachers design learning experiences that allow students to discover concepts through hands-on activities, games, and playful challenges. Rather than treating play as an extra activity, it becomes a meaningful method for deepening understanding and promoting joyful learning.

▶ Fostering Creativity and Imagination in Teaching

Fostering creativity and imagination involves designing lessons that spark curiosity and invite learners to think in original and flexible ways. Teachers encourage students to experiment, generate new ideas, and explore multiple solutions to a problem. By embedding creative tasks, open-ended questions, and imaginative scenarios, educators cultivate innovative thinking and intrinsic motivation.

▶ Supporting Emotional and Social Development through Play

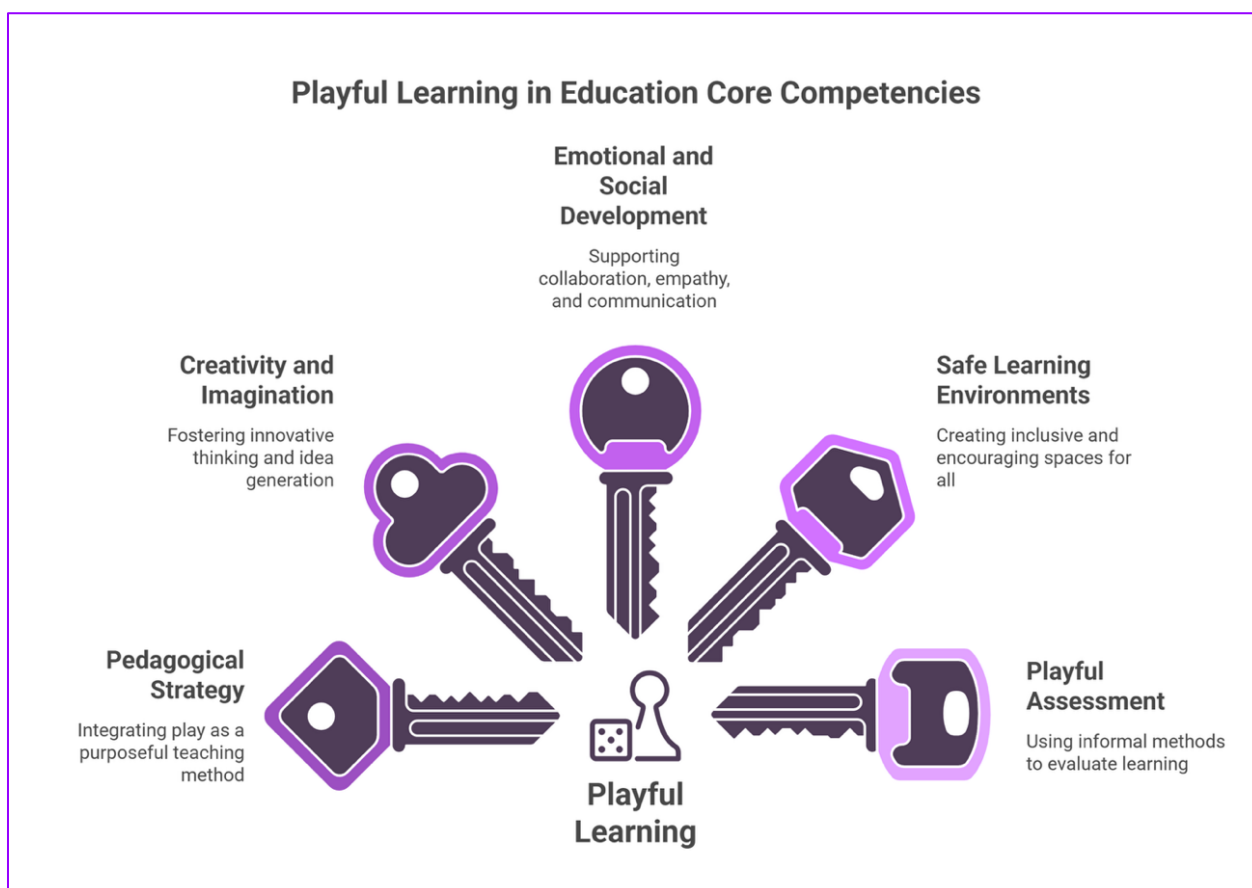
Play naturally promotes emotional expression and social interaction, making it a powerful tool for developing collaboration, empathy, and communication skills. Through shared play experiences, learners practice cooperation, negotiation, and self-regulation in a safe environment. Teachers intentionally use playful activities to strengthen social bonds and support holistic development.

► **Creating Safe, Encouraging, and Inclusive Learning Environments**

A safe and inclusive environment is essential for playful learning, as students need to feel confident taking risks and expressing themselves freely. Teachers establish clear routines, emotional safety, and a culture of respect where all learners feel valued. By promoting equity, accessibility, and encouragement, educators ensure that every child can participate meaningfully in playful experiences.

► **Assessing Learning through Playful Methods**

Assessment through playful methods uses informal, authentic strategies—such as observation, games, creative outputs, and performance tasks—to capture evidence of learning. These approaches allow teachers to evaluate understanding in a natural, engaging way while reducing pressure on students. Playful assessment provides rich insights into skills such as creativity, communication, and critical thinking.



Recommendations

Italian in-service teachers participating in the *21st Century European Teachers* project highlight the value of beginning with **simple, hands-on activities** that fit naturally into existing lessons without requiring special materials or major preparation. Working in **small groups** encourages collaboration, active participation, and collective problem-solving. Teachers recommend using **tactile and manipulative materials**, including clay, Play-Doh, everyday classroom items, or recycled materials, to help students design and build objects or prototypes that make disciplinary concepts concrete. These **sensorial and visually engaging experiences** — enhanced through music, images, and colours — support kinaesthetic learning, fine motor skills, and sustained attention.

To deepen learning, teachers propose integrating **digital tools** such as PhET Colorado, Scratch, GeoGebra, the Arduino Education Starter Kit, and Canva, which provide simulations, coding challenges, interactive tasks, and multimedia representations. Such tools not only reinforce concepts but also promote students' **digital empowerment**. It is also essential to respond to learners' **diverse needs, styles, and preferences**, ensuring inclusive and meaningful play-based learning experiences. Finally, teachers emphasise the importance of **sharing and collaborating** exchanging effective playful practices, discussing what works in classrooms, and seeking synergies across subjects to enrich teaching and strengthen a collaborative school culture.

Finnish in-service teachers involved in the *21st Century European Teachers* project emphasise that effective playful learning depends on creating a **safe, supportive, and encouraging atmosphere** where students feel confident experimenting and using language through play. Essential competencies include **creativity, flexibility, strong interaction skills**, and the ability to connect learning content with **active, playful methods** such as storytelling, role play, and collaboration. Teachers must also be able to **observe group dynamics**, ensure participation from all students, and make purposeful use of the school's **surroundings — nature, playgrounds, and local environments**— as spaces that naturally foster playful exploration. Starting small is recommended, using **simple language games, wordplay, and short active exercises**, while maintaining clear rules that ensure safety, respect, and emotional security.

A growing concern among teachers is that many children show **weakened basic play skills**, which may stem from reduced face-to-face interaction, increased screen time, highly structured schedules, and less unstructured outdoor play. This trend places greater responsibility on schools to **support, teach, and protect play** as both a pedagogical tool and a foundation for social development. In this sense, playful learning requires thoughtful **planning, creativity, and inclusive practices**, beginning with familiar content and gradually expanding through storytelling, the school environment, and digital resources. Ultimately, maintaining playfulness in education not only enhances learning but also strengthens children's **social skills, collaboration, and wellbeing**.

For Pre-Service Teachers:

- ▶ **Complete the Playful Learning in Education MOOC** to build a strong foundational understanding of playful pedagogies: <https://21centuryeuteachers.eun.org/playful-learning-in-education-mooc>
- ▶ **Explore case studies from the XXI-EU-TEACH project** (including examples from the Palermo visit) to see how playful learning is implemented in real educational settings.
- ▶ **Practice designing playful learning environments and activities**, experimenting with a variety of materials, methods, and levels of guidance.

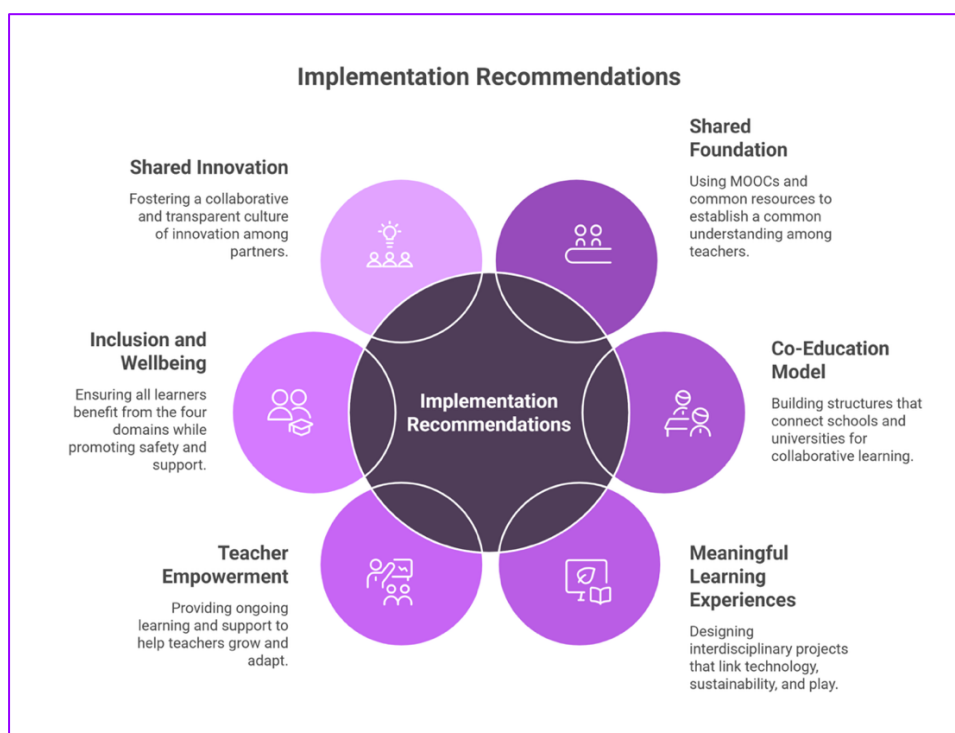
- ▶ **Reflect on the cognitive, social, and emotional roles of play**, understanding how playful experiences support children's holistic development.
- ▶ **Use your traineeship as a safe space for experimentation**, testing playful learning methodologies with children, observing what works, and refining your approach. Consider dedicating your **thesis, course paper, or practical assignment** to an aspect of playful learning that particularly interests you.

For In-Service Teachers:

- ▶ **Complete the Playful Learning in Education MOOC** to enhance or refresh your knowledge and deepen your understanding of playful approaches: <https://21centuryteachers.eun.org/playful-learning-in-education-mooc>
- ▶ **Integrate gamification, storytelling, and play-based strategies** into your lessons to increase engagement, motivation, and creativity.
- ▶ **Adopt a playful learning mindset**, viewing everyday objects, spaces, and situations as potential learning tools. Any game can become a learning opportunity —and any learning goal can be playfully explored.
- ▶ **Seek professional development opportunities** such as university courses, workshops, MOOCs, and mobility programmes. Explore local promoters of playful learning —**museums, libraries, cultural centres, and associations**.
- ▶ **Learn from others** by exchanging ideas, resources, and experiences with colleagues, teacher networks, university partners, and international peers. Collaborative learning enriches practice and strengthens confidence in playful pedagogy.
- ▶ **Value and promote the inclusive power of play**, recognising it as a universal language that can engage learners with diverse backgrounds, abilities, and needs.
- ▶ **Use play to support inclusive and differentiated learning**, ensuring every learner can participate meaningfully and at their own pace.
- ▶ **Share best practices** through coteaching, study visits, professional learning communities, and teacher networks.
- ▶ Make use of European lifelong learning and teacher-training platforms —**eTwinning, EPAL**, and other EU-supported networks— to continue growing professionally and expanding your playful learning practice.

Implementation Recommendations

Successful implementation of **technological empowerment, sustainability, entrepreneurship, and playful learning** requires more than new materials or training. It relies on shared understanding, strong partnerships, intentional design, and long-term commitment across schools, universities, and education systems. The recommendations below draw on the experiences of project partners and participating teachers, offering practical steps to embed these four domains meaningfully into teacher preparation and school development.



Build a shared foundation: Use MOOCs and common learning resources

- ▶ Use the project's MOOCs (see <https://21centuryeuteachers.eun.org/mooc>) as **foundational training tools**, providing all teachers and student teachers with shared conceptual grounding.
- ▶ Incorporate MOOCs into coursework, practicum preparation, induction programmes, and school based professional learning.
- ▶ Encourage teachers to form study groups or reflective circles around MOOC modules to deepen understanding and link theory to practice.
- ▶ Ensure MOOC learning translates into action by connecting it to coteaching tasks, lesson design, classroom trials, or school projects.
- ▶ Align teacher professional development with **policy recommendations** emerging from the project, ensuring coherence between training, practice, and system level innovation.

Collaborate through the co-education model: Build structures that connect schools and universities

- ▶ Clearly communicate the **principles and purpose of the coeducation model**, emphasising its benefits for teaching quality, student learning, and teacher identity.
- ▶ Form structured partnerships between universities, schools, and other institutions to jointly plan and evaluate coteaching and innovation activities.
- ▶ Use joint **co-design sessions** to align activities with curriculum goals, student needs, and emerging societal challenges (digitalisation, sustainability, inclusion).
- ▶ Integrate coeducation activities into the **academic year calendar**, ensuring protected time for planning, implementation, and reflection.
- ▶ Allocate resources —human, organisational, and financial— to support sustained collaboration and reduce workload barriers.
- ▶ Encourage **mobility and exchange programmes** to allow teachers and student teachers to observe innovative practice across European contexts.

Design meaningful learning experiences: Connect the four domains through authentic, interdisciplinary practice

- ▶ Develop interdisciplinary projects that link technology, sustainability, entrepreneurship, and playfulness, helping students understand real-world problems holistically.
- ▶ Encourage teachers to begin with small-scale experiments—playful tasks, sustainability Mini projects, digital inquiry activities, or entrepreneurial challenges—and expand gradually.
- ▶ Use project-based learning cycles to help students investigate local issues, design solutions, collaborate online, and present outcomes creatively.
- ▶ Support teachers in embedding **digital citizenship, sustainability themes, and creative problem-solving** within everyday teaching, not as separate topics.
- ▶ Incorporate playful approaches such as storytelling, roleplay, hands-on making, or gamified challenges to increase student engagement and inclusion.

Empower teachers through ongoing learning: Reflect, adapt, and grow together

- ▶ Treat implementation as a **continuous learning journey** with structured reflection points after modules, projects, and pilot phases.
- ▶ Encourage teachers to participate in **professional learning communities**, both locally and internationally, where they exchange ideas and refine their practice.
- ▶ Use mobility visits, study trips, and virtual exchanges to gather examples of innovative teaching and bring these back into local contexts.
- ▶ Promote a growth mindset where mistakes, challenges, and experimentation are seen as valuable learning opportunities.
- ▶ Support teachers in building **personal learning networks (PLNs)** that extend beyond their institution—connecting with peers, researchers, and European networks such as eTwinning or EPALE.

Promote inclusion and wellbeing: Ensure all learners benefit from the four domains

- ▶ Use play as an inclusive practice: a universal language that engages diverse learners and supports emotional and social development.
- ▶ Design digital learning that is accessible, culturally responsive, and mindful of the digital divide.
- ▶ Embed sustainability as a shared responsibility, involving students, families, and community partners in schoolwide initiatives.
- ▶ Encourage student agency through entrepreneurial thinking—allowing learners to take initiative, develop ideas, solve problems, and lead change.
- ▶ Protect student wellbeing by ensuring ethical digital practices, safe learning environments, and emotionally supportive classroom cultures.

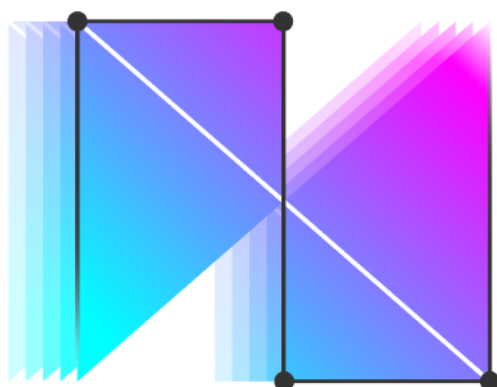
Create a culture of shared innovation: Make change collaborative, transparent, and sustainable

- ▶ Maintain transparent communication across partners by sharing meeting notes, resources, tools, and project outputs in accessible platforms.
- ▶ Build a repository of codesigned materials, lesson plans, and examples of practice that all partners can use and adapt.
- ▶ Celebrate milestones—pilot projects, student achievements, exchange visits, or new materials—to strengthen motivation and partnership cohesion.
- ▶ Regularly revisit shared goals and collaborative agreements, adapting them in response to emerging insights or changing contexts.
- ▶ Encourage educators to see themselves as **co-creators and innovators**, shaping the future of teaching rather than simply implementing ideas.

Together, these recommendations emphasise that successful implementation of the four domains requires more than tools or training — it requires shared vision, strong relationships, intentional collaboration, authentic learning experiences, and a commitment to equity and inclusion. By working in partnership across schools, universities, and European networks, education systems can develop resilient, future-ready teachers who empower students to thrive in a rapidly changing world. Taken together, the competencies across the four domains highlight a future-oriented teacher identity grounded in reflective agency, collaboration, ethical decision-making, and creative problem-solving.

References

- Council of Europe. (2019). *Digital citizenship education handbook: Being online, well-being online, rights online*. Council of Europe Publishing. <https://rm.coe.int/16809382f9>
- Harju-Luukkainen, H., Garvis, S., Kangas, J., Marôco, J., Maunula, M., & Maunumäki, M. (2025). *Generating sustainable futures through teacher education: Globally rethinking higher education*. Routledge.
- Kangas, J., Maunumäki, M., Maunula, M., & Harju-Luukkainen, H. (2024). Critical considerations of sustainable teacher education in Finland. *Education in the North*, 31(1), 62–78. <https://doi.org/10.26203/k107-3324>
- Niemi, L. H. L., Kangas, J., & Köngäs, M. (2024). Blending pedagogy: Equipping student teachers to foster transversal competencies in future-oriented education. *Frontiers in Education*, 9, Article 1373176. <https://doi.org/10.3389/feduc.2024.1373176>
- Paz-Albo, J., Jor'dan, J. R., & Hervás-Escobar, A. (2023). Promoting family engagement: Computer-based simulations and teacher preparation. *Journal of Education for Teaching*, 49(4), 583-596. <https://doi.org/10.1080/02607476.2022.2142099>
- Ranta, S., Kangas, J., Maunula, M., Harju-Luukkainen, H., Sundstedt, M., & Olli, L. (2025). Future skill requirements for blended teacher training: Developing a new ECE teacher training program for adult students in Finland. *The Journal of Continuing Higher Education*, 1-16. <https://doi.org/10.1080/07377363.2025.2544360>
- 21st Century European Teachers (2025). Sustainability in Education [MOOC]. <https://21centuryeuteachers.eun.org/sustainability-in-education-mooc>
- 21st Century European Teachers (2025). Technological Empowerment in Education [MOOC]. <https://21centuryeuteachers.eun.org/tech-empowerment-in-education-mooc>
- 21st Century European Teachers (2025). Playful Learning in Education [MOOC]. <https://21centuryeuteachers.eun.org/playful-learning-in-education-mooc>
- 21st Century European Teachers (2025). Entrepreneurship in Education [MOOC]. <https://21centuryeuteachers.eun.org/entrepreneurship-in-education-mooc>
- 21st Century European Teachers (2026). Co-Creation in Education [MOOC]. <https://21centuryeuteachers.eun.org/entrepreneurship-in-education-mooc>
- OECD. (2018). *OECD Future of education and skills 2030: OECD Learning Compass 2030*. OECD Publishing. <https://www.oecd.org/en/data/tools/oecd-learning-compass-2030.html>
- UNESCO. (2018). *UNESCO ICT competency framework for teachers (Version 3)*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000265721>
- UNESCO. (2024). *AI competency framework for teachers*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000391104>



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