DIGITAL PATHWAYS TO EMPOWERMENT: FOSTERING FUTURE SKILLS THROUGH MICROLEARNING AND MOOC PLATFORMS

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25.-26.6. 20th international conference DisCo 2025 Empowering Futures: Leveraging Digital Technologies in Education for Youth, Women, and Vulnerable Groups
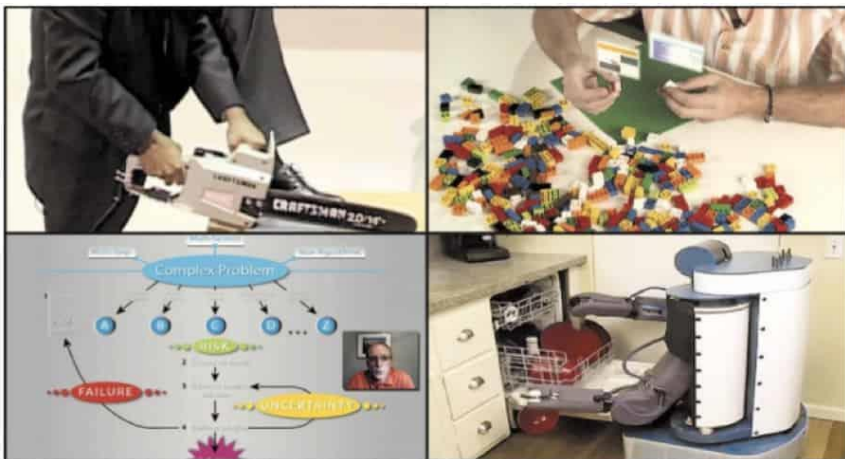
Once upon a time...

EDUCATION LIFE

The Year of the MOOC

By LAURA PAPPANO   NOV. 2, 2012

The New York Times

Clockwise, from top left: an online course in circuits and electronics with an M.I.T. professor (edX); statistics, Stanford (Udacity); machine learning, Stanford (Coursera); organic chemistry, University of Illinois, Urbana (Coursera).

IN late September, as workers applied joint compound to new office walls, hoodie-clad colleagues who had just met were working together on deadline. Film editors, code-writing interns and "edX fellows" — grad students and postdocs versed in online education — were translating videotaped lectures into MOOCs, or massive open online courses. As if anyone needed reminding, a row of aqua Post-its gave the dates the courses would "go live."
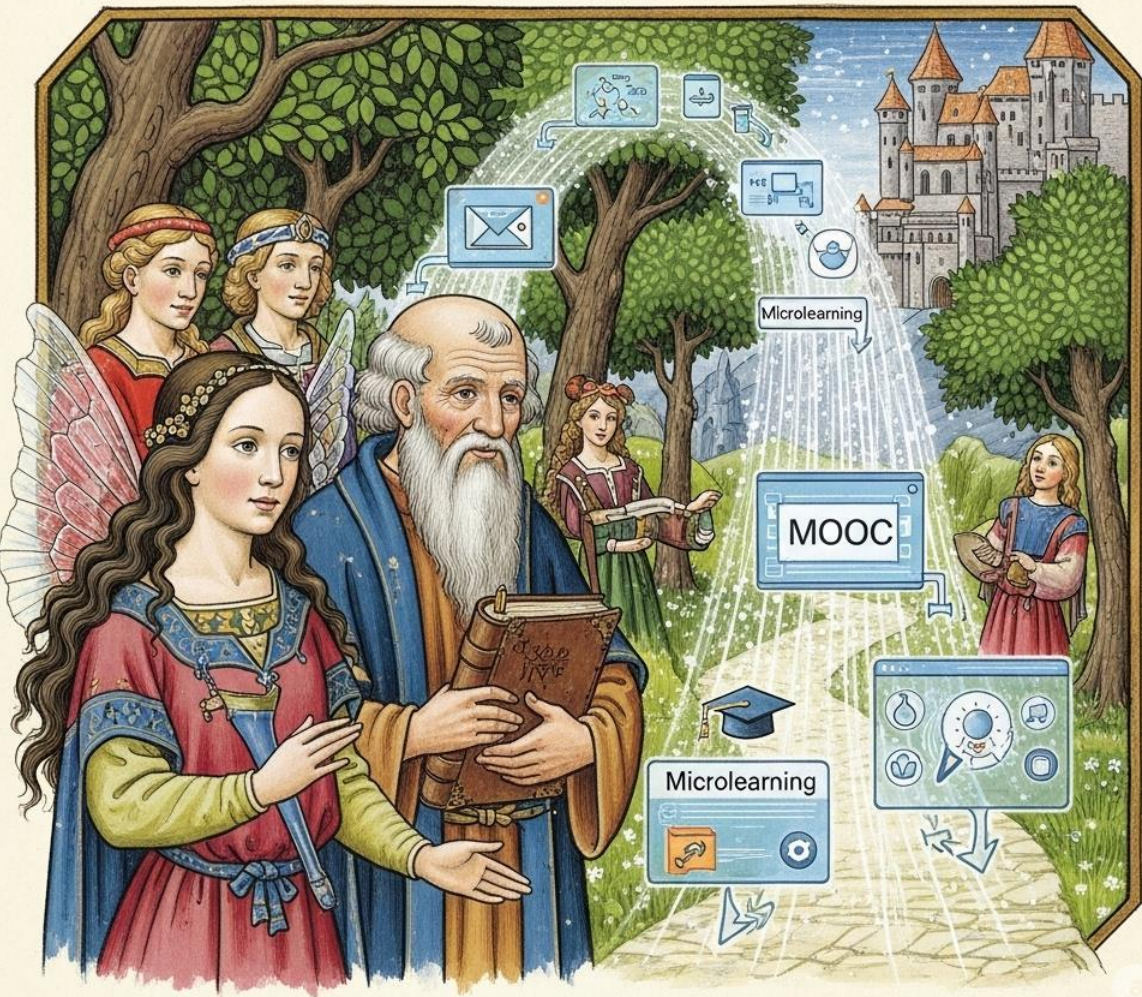
UP1

EDEN
EUROPE
DIGITAL LEARNING

E³UDRES²

Engaged and Entrepreneurial European University as Driver for European Smart and Sustainable Regions

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The Global Shift in Work & Learning

Technology Transforming Work

🌐 Automation, AI, and digitization are redefining skill needs in the workplace, making lifelong learning essential rather than optional.

Education Challenges

📉 Traditional education systems are inflexible and slow to adapt, with limited accessibility for remote, underserved, or non-traditional learners.
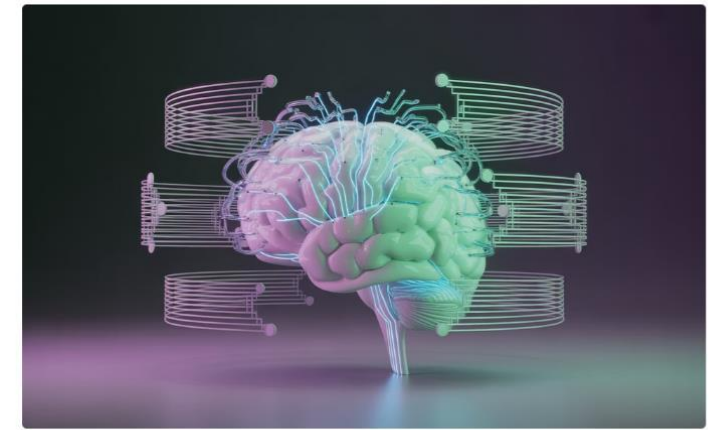
Future Skills Demanded

🧠 The changing landscape requires crucial skills like **adaptability**, **digital literacy**, and **entrepreneurial & innovative thinking**.

Why Access & Scalability Matter

Vulnerable groups often left behind

Youth without stable education paths, women balancing work and caregiving, rural communities and displaced learners face significant barriers to traditional education.

Digital learning bridges the gap

Scalable, affordable, and flexible solutions reach those excluded by traditional systems, building **future-ready, resilient communities**.

Empowerment through access

🧩 **Empowerment through access** = Economic inclusion + Social mobility

DIGITAL SKILLS

Information / data literacy

- Browsing, searching and filtering data, information and digital content
- Evaluating data, information and digital content
- Managing data, information and digital content

Communication and collaboration

- Interacting via ICT
- Sharing via ICT
- Engaging in citizenship via ICT
- Collaborating via ICT
- Netiquette
- Managing digital identity

Digital content creation

- Developing digital content
- Integrating and re-elaborating digital content
- Copyright and licences
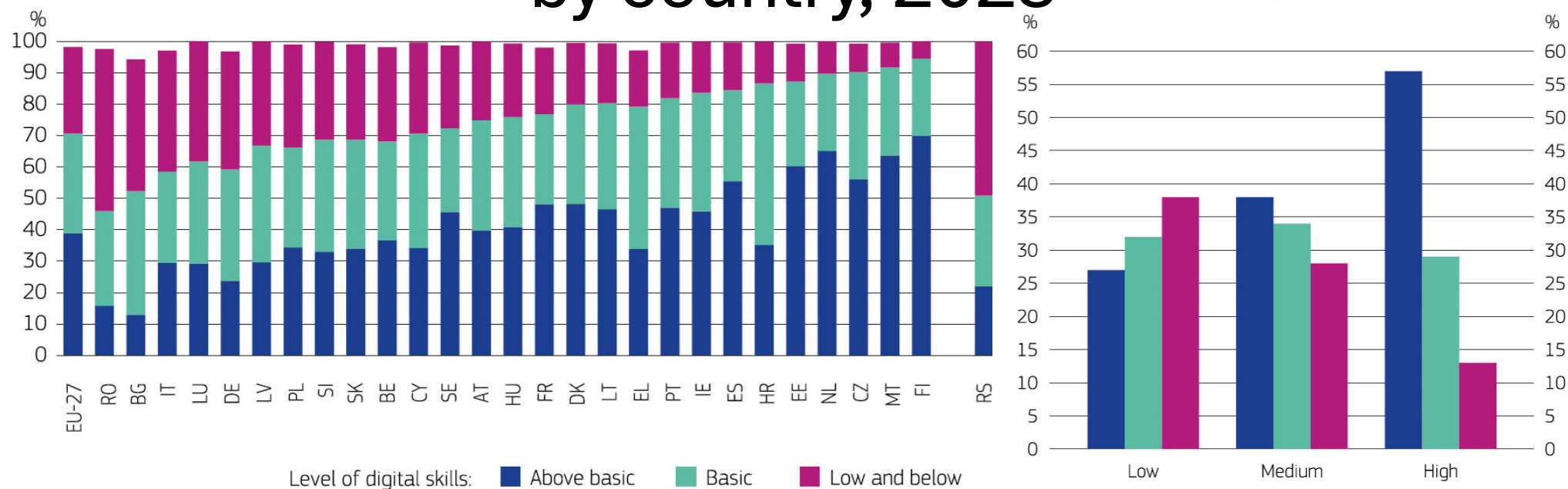- Programming

Safety

- Protecting devices
- Protecting personal data and privacy
- Protecting health and well-being
- Protecting the environment

Problem solving

- Solving technical problems
- Identifying needs and technological responses
- Creatively using digital technologies
- Identifying digital competence gaps

Young people's (16–29) level of digital skills, by country, 2023

What is the digital skills gap?

Source: https://digital-strategy.ec.europa.eu/en/policies/digital-skills-and-jobs

Image generated by ChatGPT

The Digital Skills Gap in Europe

4 in 10 adults
and 1 in 3 workers in Europe lack basic digital skills

1 in 6 ICT specialists
and 1 in 3 STEM graduates are women, showing a gender gap in tech fields

Over 70% of businesses
report a shortage of digitally skilled staff, limiting growth and innovation

70% of adults
The EU aims for to have basic digital skills by 2025, but significant gaps remain, especially among youth and marginalized groups

Beyond Degrees: Mastering Upskilling, Reskilling, & Cross-Skilling

Traditional degrees are a strong foundation, but lifelong learning is now paramount. Universities should emphasize:

Upskilling

Deepening expertise within a discipline (e.g., a humanities student learning AI for digital archiving)

Reskilling

Equipping graduates for entirely new career paths (e.g., a biology graduate gaining data science skills for biotech)

Cross-skilling

Fostering versatile competencies applicable across multiple fields, creating T-shaped professionals with both deep disciplinary knowledge and broad transferable skills

FUTURE SKILLS
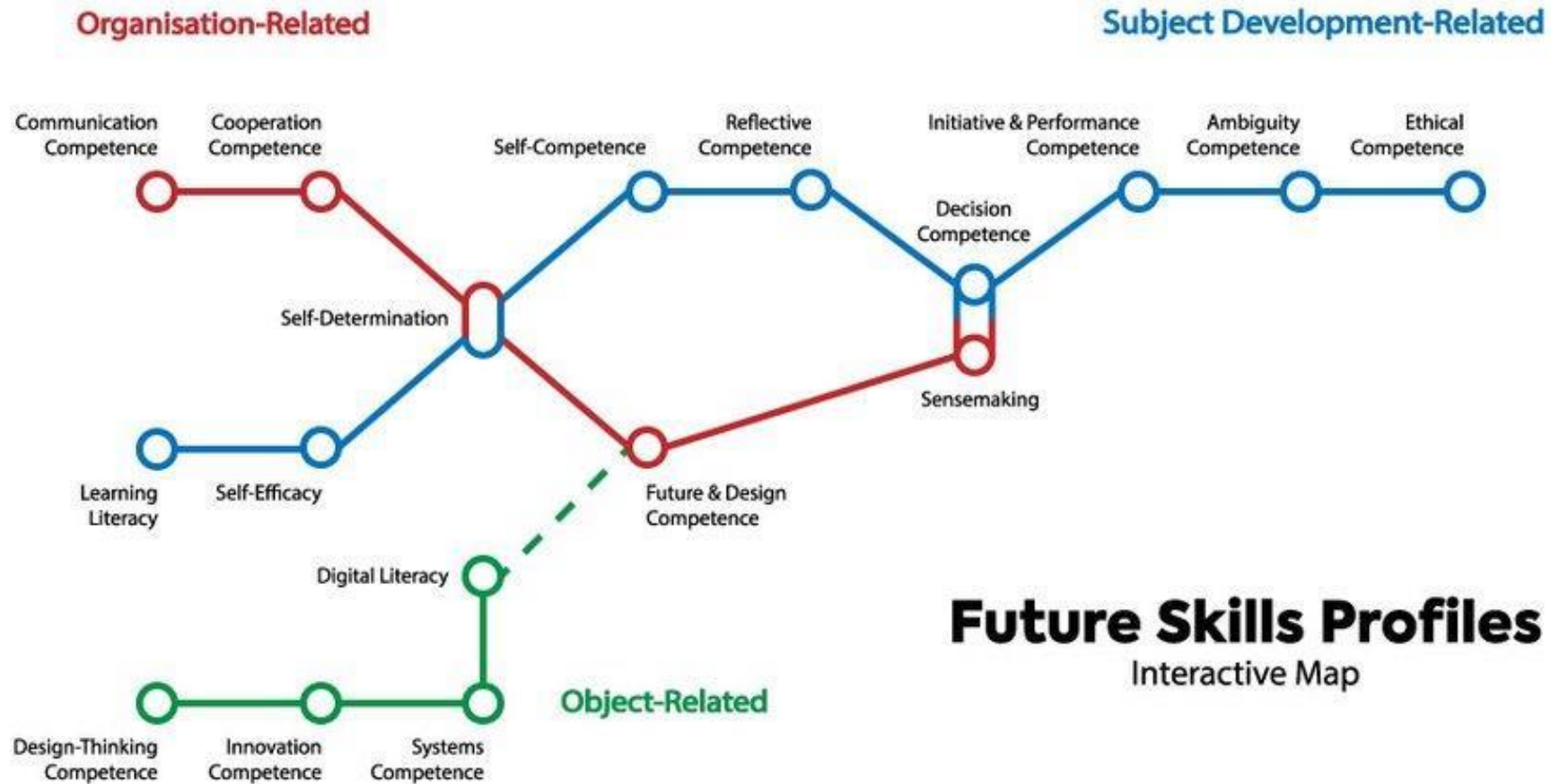
Source - UNESCO IESALC. (2021). Pathways to 2050 and beyond: Findings from a public consultation on the futures of higher education. https://unesdoc.unesco.org/ark:/48223/pf0000379985/.

What is Microlearning

Definition

Microlearning delivers short, focused learning units designed for immediate application.

Core Principles

- **Short & Digestible** — Small chunks of content (3–10 minutes)
- **Focused** — Targets specific skills or knowledge
- **Just-in-Time** — On-demand access when learners need it

Common Formats

Videos

Infographics

Podcasts

Micro Games

Why Microlearning works?

Backed by Cognitive Science

- **Improved Attention:** Short bursts prevent cognitive overload
- **Higher Retention:** Frequent, spaced learning supports long-term memory
- **Greater Relevance:** Learners apply knowledge immediately, reinforcing learning

Engagement Benefits

Interactive, visually appealing formats drive motivation and active participation, leading to higher completion rates compared to traditional e-learning methods.

Recent studies show retention rates up to 60% higher with microlearning versus conventional approaches.

Benefits for empowerment

Supports Busy Learners

Fits into tight schedules (ideal for youth, women with caregiving roles, and working adults)

Scalable Impact

Easily adaptable for large, diverse populations across different regions and cultural contexts
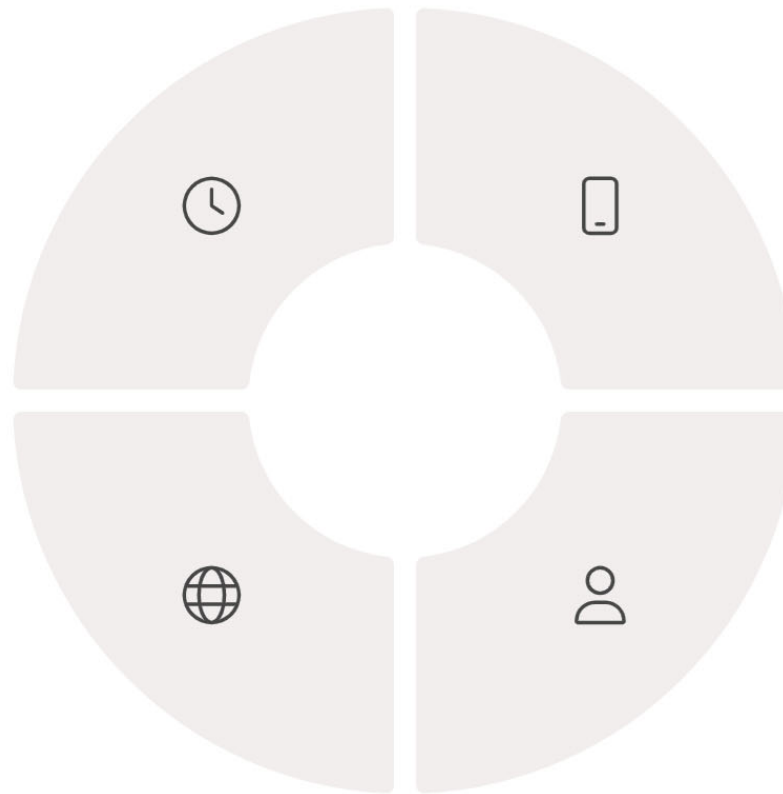
Affordable & Accessible

Mobile-friendly and low-cost — reaching marginalized and rural communities with limited resources

Enables Self-Paced Learning

Empowers learners to control their learning journey, boosting confidence and autonomy

EUROPEAN UNIVERSITIES ALLIANCE

E³UDRES²

2019 - ONGOING

E³UDRES² Partners

List of Beneficiaries and Affiliated Entities

BE NR/AE	BE/TP name	Acronym	Country
BE 001	St. Pölten University of Applied Sciences	STPUAS	AT
BE 002	Hochschule Fulda-University of Applied Sciences	HFD	DE
BE 003	Instituto Politecnico de Sétubal	IPS	PT
BE 004	JAMK University of Applied Sciences	JAMK	FI
BE 005	Hungarian University of Agriculture and Life Sciences	MATE	HU
BE 006	Saxion University of Applied Sciences	SAXION	NL
BE 007	UC Limburg	UCL1	BE
BE 008	Universitatea Politehnica Timisoara	UPT	RO
BE 009	Vidzeme University of Applied Sciences	VIA	LV
BE 010	UC Leuven	UCL2	BE
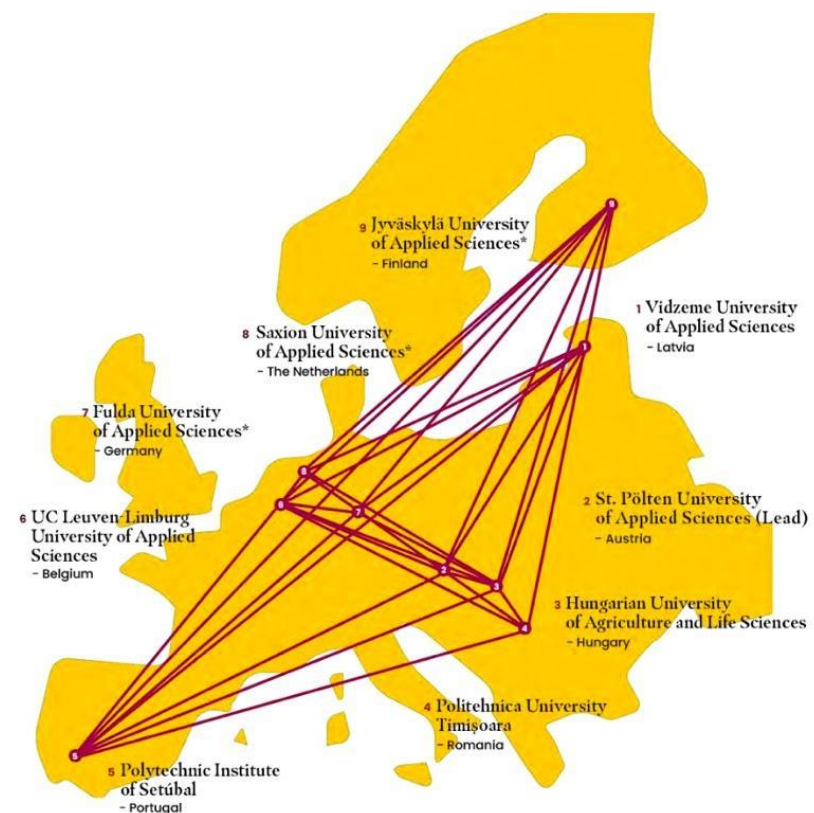
Future Appetizers: A Microlearning Example

Program Features

- Short, engaging "blended learning snacks" for flexible, self-directed learning

- Multiple formats: Podcasts, Vodcasts, Peer Reviews, Micro Games, Lab Sessions, Live Sessions

- Diverse topics: Creative Skills, Digital Skills, Global Citizenship, Environmental Stewardship

Implementation & Impact

- Recognized format: 2 ECTS (approx. 56 hours of work)

- Part of the E^{3}UDRES^2 Talent Funnel (awareness phase)

- Aimed to engage 5,000+ students (currently piloted with 100+ learners)

- Builds foundation for deeper experiences (Hackathons, Living Labs)

This example demonstrates how microlearning principles can be effectively implemented in higher education contexts to reach diverse student populations.

E^{3}UDRES^2

Engaged and Entrepreneurial European University as
Driver for European Smart and Sustainable Regions

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...vely implemented in higher education contexts

Talent Funnel diagram:

TALENT APPETIZERS

TALENT TV
E³UDRES² Talent Netflix
Play-Tease-Learn
Story weaving & Student channel

Micro learnings snacks
Short add-on learning snacks
Business-Tech-Talent development

TALENT MATCHING
Matching & Sharing app
Battery of Change Profile
MatchMaking career & LLL portal

INTERNATIONAL ENGAGEMENT CIRCUS
Bank of StartUPs
Bank of Innovation angels
Bank of challenges owners
Bank of Mentors
Bank of Researchers
SU ME BA CO RE

Engagement

CROSS-COURSES
Hackathon
Ilivinglabs
Bootcamps
Internships

Smart education

SPIN-OUTS
Sandbox
Alumni club

Impact

E³UDRES²
Engaged and Entrepreneurial European University as
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Definition of E^{3}UDRES^2 Microcredentials

- Definition Summary: Certification of assessed learning (1–6 ECTS)

- Key Characteristics: Short-term, skill-focused, stackable, complementary to traditional degrees.

Framework overview: core principles

1   Alignment with European Frameworks

Ensuring compatibility with established educational standards across Europe.

2   Learner-Centred Focus

Tailoring educational experiences to meet individual needs and goals.

3   Quality Assurance and Evaluation

Maintaining high standards through rigorous assessment processes.

4   Verification and Portability

Enabling easy recognition and transfer of credentials across institutions.

5   Accreditation and Recognition

Collaborating with key stakeholders to ensure widespread acceptance.

Microcredential Development (Part 1)

Needs Assessment

1 Identify skill gaps in areas like soft skills and digital competencies.

Collaboration

2 Partners jointly design stackable, flexible credentials to address identified needs.

Design

3 Create modular, targeted learning experiences aligned with industry demands.

Microcredential Development (Part 2)

Learning Outcomes

Define using the European Qualifications Framework (EQF).

Delivery Formats

Offer flexible options: onsite, online, or hybrid.

Assessments

Implement clear, reliable strategies to ensure credibility.

Implementation Highlights

Digital Credentialing

Utilize blockchain, EBSI, and open badges for secure verification.

Standardized Processes

Ensure uniformity across partner institutions for consistency and quality.

Advocacy

Engage with policymakers to promote recognition and adoption.

Critical Information Requirements

Title	Issuer	Learning Outcomes
Language	Duration	Mode of Delivery
Assessment Method	Quality Assurance	Credits (ECTS)

These metadata elements ensure transparency and usability for learners and employers.

What is a MOOC?

Massive
Unlimited enrollment, often thousands of students

Open
Free or low-cost, accessible to all backgrounds

Online
Fully digital delivery through web platforms

Course
Structured learning with clear outcomes
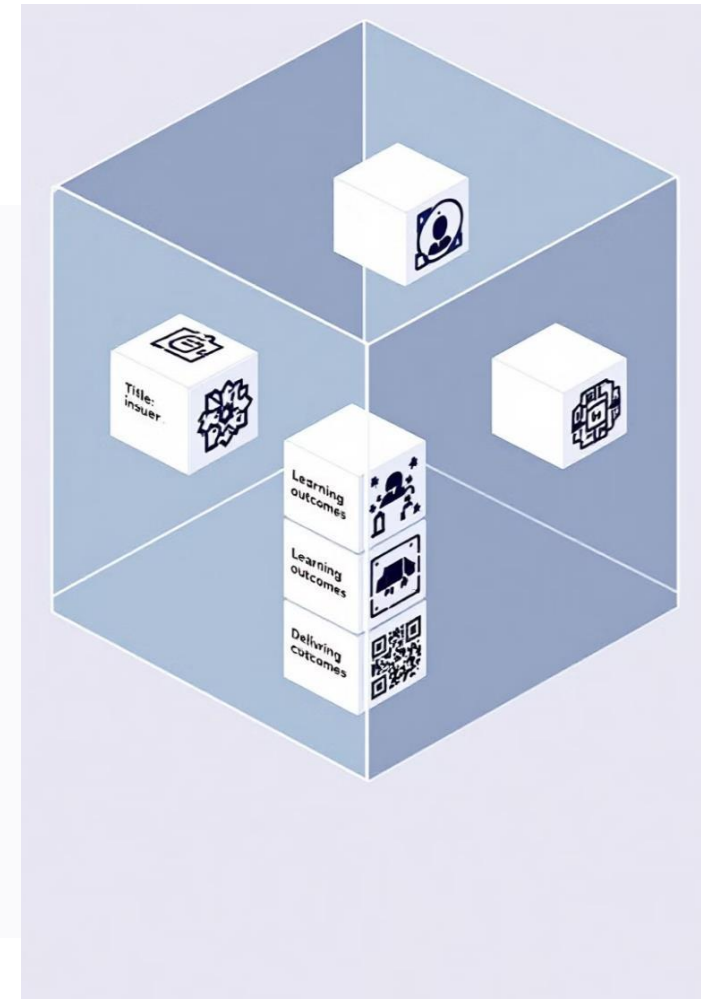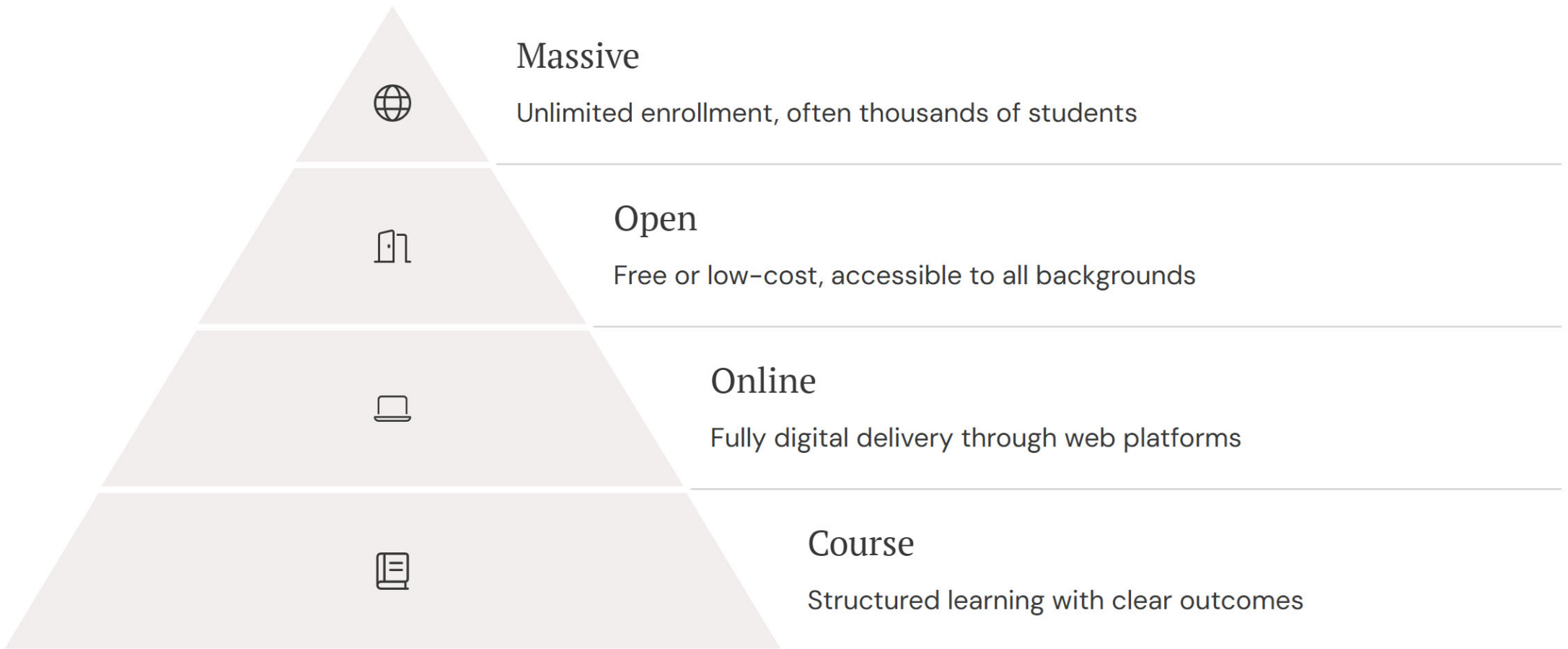
Global Impact of MOOCs

📊 Global Reach & Enrollment

Over 220 million learners worldwide (Class Central, 2024) with rapid growth during and post-pandemic era

👥 Diverse Learners

Youth, mid-career professionals, women re-entering the workforce, with strong uptake in developing regions with limited traditional access

🌞 Empowerment Through MOOCs

🔧 **Entrepreneurship Skills** – Business, innovation, leadership

🌍 **Regional Access** – Rural and underserved populations

🔄 **Lifelong Learning** – Upskilling, reskilling, career change

Massive Open Online Courses

xMOOCs vs cMOOCs

xMOOCs ← – – – – – – – → **cMOOCs**

xMOOCs	cMOOCs
Platform	Connect
Academic oriented	Network
Assessment	Learner-centered
Linear	Peer founded
	OERs, xMOOCs

MOOC Platform Features

Interactive Content

Video lectures, readings, and hands-on modules engage learners. Content is designed for self-paced discovery.

Assessment Tools

Online quizzes with automatic grading provide immediate feedback. Peer assessments encourage deeper engagement.

Community Learning

Discussion forums connect global participants. Students learn from diverse perspectives and instructor guidance.

Cloud Technology

Learning Management Systems like Coursera and edX deliver seamless experiences. They scale to millions of users.

Flipped classroom with OERs and MOOCs

✓ **Inverted Learning Model:** Students absorb lecture content via MOOCs at home before class.

✓ **OER Integration:** Free, adaptable Open Educational Resources supplement MOOC materials.

✓ **Collaborative Activities:** Class time shifts to problem-solving and peer learning.

✓ **cMOOCs Approach:** Connectivist MOOCs foster knowledge creation through social networks.

✓ **Global Classroom:** International partnerships create diverse learning communities.

Flipped classroom & blended learning

- ➢Giving students more opportunities to work collectively
- ➢New methods of teaching STEM subjects and new approaches to engineering education
- ➢Online Study skills for students' lifelong learning
- ➢Awareness and experimentation in a (some-what) supervised environment

Integrating MOOCs in the traditional course

Students enrolled in our courses were asked to take an online MOOC course (usually from a given list).

Graded report, presentation and anonymous questionnaire for evaluating.

Most of them did well and considered the activity positive

Benefits/Challenges of MOOCs integration in flipped classrooms

Student Empowerment
- ✓ Autonomy to assess personal learning needs
- ✓ Freedom to select relevant MOOCs
- ✓ Development of crucial digital literacy skills
- ✓ Building lifelong learning habits
- ✓ Enhanced collaboration across global communities
- ✓ Critical information curation abilities

What is Autonomous Learning?

Self-directed

Learner takes responsibility for educational choices

Initiative-driven

Requires concrete actions and personal drive

Intrinsically motivated

Internal rewards replace external incentives

Empowering

Individuals take charge of their learning journey

MOOCs and Self-Paced Learning

Access for All

MOOCs democratize quality educational content globally

Goal-Setting

Increases MOOC completion success threefold

Career Impact

72% report improved professional prospects

Flexibility

Learning around existing life commitments

The evolution of Artificial Intelligence

| 1950 | 1 |
Alan Turing publishes "Computing Machinery and Intelligence"
"We can only see a short distance ahead, but we can see plenty there that needs to be done."

| 2 | 1980s |
Neural networks emerge as a significant AI approach

| 1997 | 3 |
IBM's Deep Blue defeats world chess champion Garry Kasparov

| 4 | 2016 |
DeepMind's AlphaGo beats world champion Go player Lee Sodol

| 2023 | 5 |
Rise of large language models like ChatGPT, transforming education and work

What we have...?

Generic chatbots

Copilot PRO

ChatGPT · Grok · Gemini · deepseek · Claude · Manus · perplexity

Specific applications

Writing Assistant: POSTLY, Spellbook by Rally, Kwirk, Soofy., SEO, EmailMagic.ai, BOTIKA, MateAI, ChatGPT Writer, HirePeople, supertranslate, Reply, LanguageTool Your writing assistant, Writey A.I, NeuroSpell

Content & Idea Creation: kickresume, Text Generator Plugin, SEO.ai, contents.com, Jasper, InstaNovel.AI, Sivi, PatentPal, tome, Harmonai, LEGALESE DECODER, text.cortex, Paraphrase Tool, daydrm.ai, CSM

Generative & Search Assistants: Dystr, Perplexity, Lexii.ai, ExplainThis, ProductBot, Andi, ChatGPT Extension, EvelynAI, Mighty GPT, KOMO, Alfred, Moveworks, Teach Anything

Data Extraction & Conversational Search: Channel, kadoa, context, RTutor, oss Insight, CORPORA, Elicit, TableTalk

Developer/Coding Assistants: Refraction, PHIND, CodeAssist, CodeGeeX

Use case-Specific Data

PDF, W, P, Notion, Dropbox, OneDrive, SharePo, Drive, box, Outlook, slack, zoom, Gmail, Microsoft Teams, salesforce, Dynamics 365, Jira, zenhub, GitHub

Model Creation

deepseek, AI21labs, OpenAI, NVIDIA, Adept, EleutherAI, Grok, ANTHROP\C, Google AI

Hardware

habana, NVIDIA, SambaNova SYSTEMS, cerebras, GRAPHCORE

Fine Tuning

Google AI, aws, OpenAI, Hugging Face

Generic World Knowledge

Common Crawl, Wikipedia The Free Encyclopedia, arXiv, PubMed

Source: dr. Diana Andone, Politehnica University Timisoara

What Are the Main Concerns around AI in Education?

Concerns around cheating and plagiarism call for rethinking of academic integrity policy and assessment in a world without reliable AI detection tools.

					Leaders
24% Increase in plagiarism and cheating	**21%** **Lack of IT resources and technical readiness/expertise** to implement AI tools	**21%** **Ensuring equitable access** to AI tools for all students	**20%** **Insufficient training** for educators / administrators on understanding and effectively using AI	**20%** Potential for **becoming overly dependent** on AI tools	

					Educators
42% Increase in plagiarism and cheating	**34%** Potential for **becoming overly dependent** on AI tools	**23%** **Privacy and security concerns** related to student and staff data	**22%** **Lack of clear policies and regulations** to use AI in educational settings	**20%** **Ethical concerns**, such as impact on human autonomy and responsibility for AI-driven actions	

					Students
52% Potential to be accused of plagiarism or cheating	**48%** Potential for **becoming overly dependent** on AI tools	**30%** **Misinformation** leading to inaccurate use or interpretation of AI-generated content	**28%** **Job loss** due to automation in future career paths	**21%** **Privacy and security concerns** related to my data	

[Explore insights from the AI in Education Report | Microsoft Education Blog](#)

Source: AI in Education Microsoft Study (November 2023)
Survey question: Please select the top 3 reasons why you may be concerned about AI usage within your school/district/university.
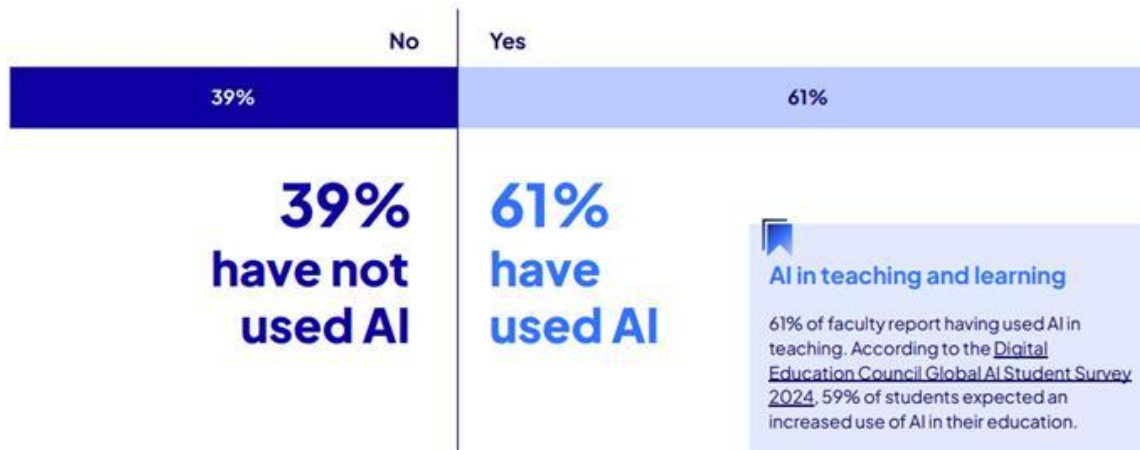
Where we are

Digital Education Council Global AI Faculty Survey 2025 | Section 1. AI in Teaching Today

61% of faculty have used AI in teaching

Faculty usage of AI in teaching, % of respondents
Question: Have you used / are you using AI in your teaching?

No	Yes
39%	61%

39% have not used AI   **61% have used AI**

AI in teaching and learning

61% of faculty report having used AI in teaching. According to the Digital Education Council Global AI Student Survey 2024, 59% of students expected an increased use of AI in their education.

From dilemmas …
What do we do when (almost) everything we do and everything we teach students to do can be achieved through AI?

To solutions …
We no longer ask **If, but How.**
It's not about what we do for our students. It's about what we help students do for themselves.
(EduCause Report, 2023)

Digital Education Council Global AI Student Survey 2024
Digital Education Council Global AI Faculty Survey 2025
Inside Higher Education -Student Voice (May 2024)

Source: dr. Diana Andone, Politehnica University Timisoara

Practical Strategy: Reflective Learning Journals

Document Learning

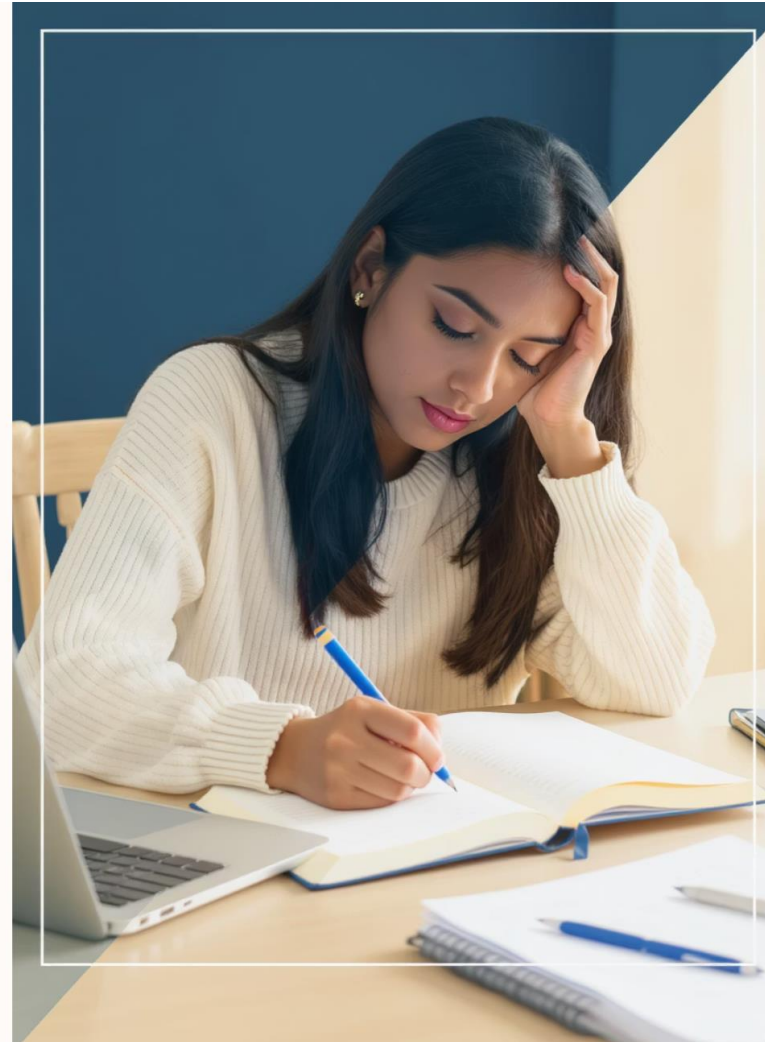Record new concepts and insights regularly. Use digital or physical journals.

Ask Key Questions

What did I learn? What was challenging? How can I apply this?

Review Regularly

Weekly reflection increases knowledge retention by 35%.

Tools: Notion, Google Docs, and dedicated journaling apps.

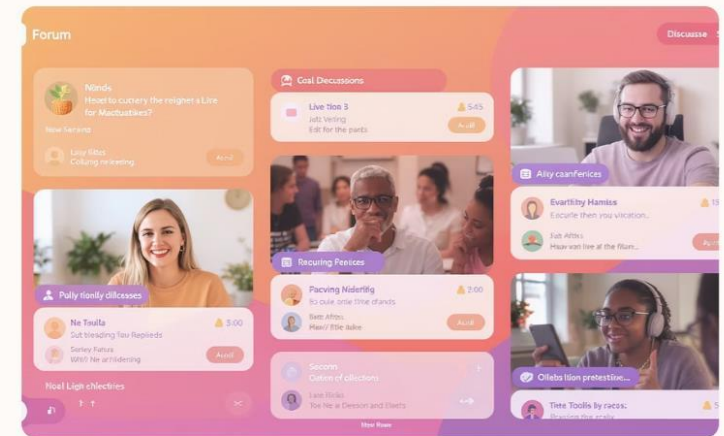# Practical Strategy: Peer Discussion Groups

Virtual Communities

Foster collaborative autonomous learning through shared experiences.
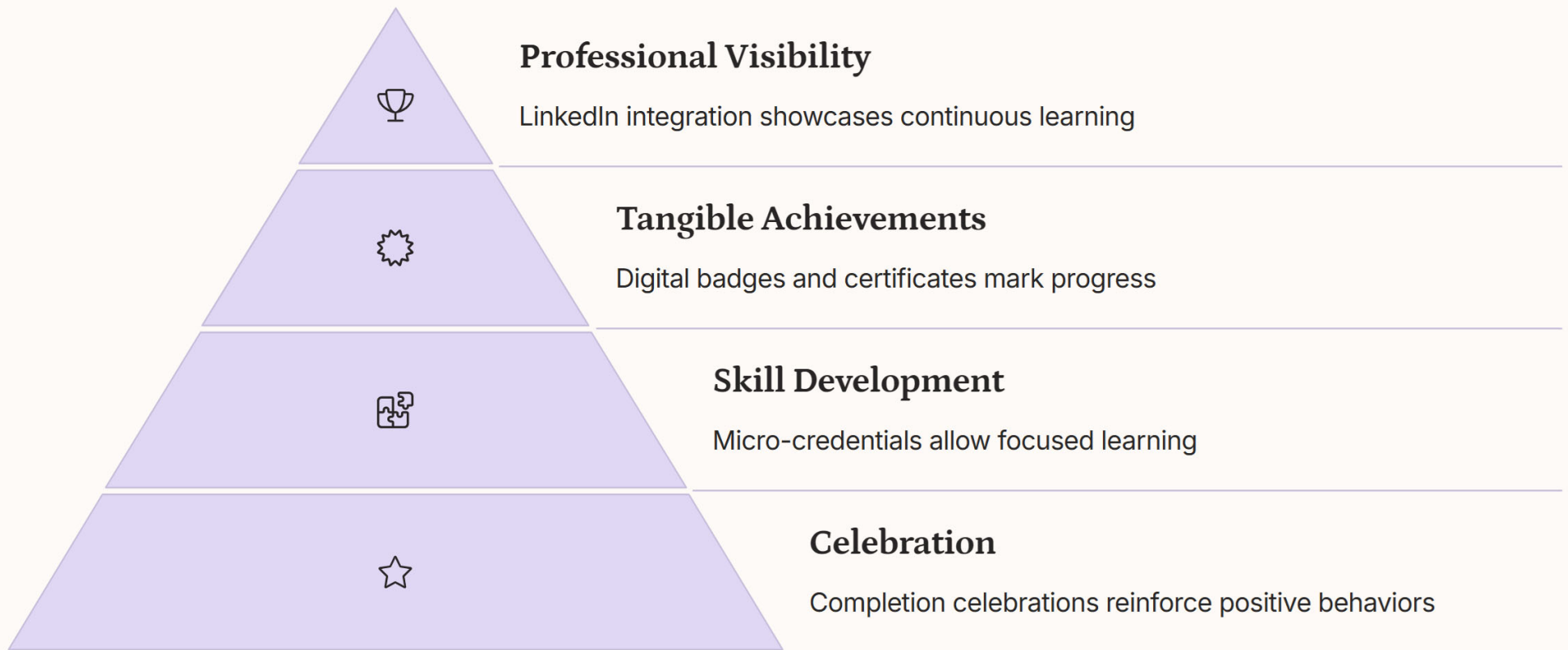
Accountability Partners

Increase course completion by 65% through mutual support.

Platform Options

Discord, Slack, and dedicated course forums facilitate interaction.

Practical Strategy: Certification and Motivation

Professional Visibility

LinkedIn integration showcases continuous learning

Tangible Achievements

Digital badges and certificates mark progress

Skill Development

Micro-credentials allow focused learning

Celebration

Completion celebrations reinforce positive behaviors

Designing inclusive microlearning content

🧩 Culturally Relevant

- Use local examples, case studies, and contexts
- Adapt visuals, humor, and symbols to resonate with diverse learners

🚻 Inclusive by Design

- **Gender-sensitive language & representation**
- Multilingual or subtitled content for accessibility
- Mobile-first formats to reach low-connectivity regions

💡 Skill–Focused

- Prioritize **practical, job-relevant skills:**
- Digital literacy, problem-solving, communication & creativity
- Align microlearning modules with real-world tasks (e.g., "How to set up a digital store")

Key takeaways

✓A global shift in work and learning demands new educational approaches.

✓Lifelong learning, reskilling, and upskilling are vital for both personal empowerment and economic viability.

✓Microlearning and microcredentials provide accessible, targeted pathways to specific competencies.

✓MOOCs democratize quality education at scale, removing barriers to specialized knowledge.

✓AI is both transforming educational delivery and becoming essential to 21st century digital literacy.

"Education's future is not just digital—it's inclusive, scalable, and transformative"

"What small step can you take today to make learning more accessible for someone?"

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