

The Zengage Learning System (ZLS): An Emerging Model for Global Standards in Transformative Technology Literacy Education



The Zengage Learning System (ZLS) is an emerging, research-informed, standards-aligned educational ecosystem designed to advance [Transformative Technology Literacy \(TTL\)](#) for academic achievement, career readiness, workforce development, and lifelong learning. By integrating the Transformative Technology Literacy Framework (TTLF), the Transformative Technology Literacy Microlearning Series (TTLMS), and the Transformative [Technology Literacy Microlearning Library \(TTLML\)](#), ZLS offers a comprehensive approach to defining, developing, assessing, validating, and recognizing technology literacy across emerging and transformative technology fields.

As artificial intelligence, extended reality, robotics, quantum computing, biotechnology, blockchain, and other advanced technologies reshape society, ZLS presents a potential contribution to the evolution of global technology literacy standards. Its emphasis on communication, comprehension, interdisciplinary fluency, and demonstrable competencies provides a foundation for exploring how technology literacy can be defined and applied more consistently across educational institutions, professional environments, and international learning systems.

1. ZLS as an emerging, standards-aligned educational model

ZLS connects established educational principles and recognized technology education standards with a practical, competency-based approach to transformative technology literacy.

Its development draws on concepts reflected in leading frameworks, including:

- ISTE Standards — technology-enabled learning, digital citizenship, and the effective use of technology.
- UNESCO ICT Competency Framework for Teachers — technology integration, professional development, and the transformation of teaching and learning.
- NAEP Technology and Engineering Literacy Framework — understanding, developing, and applying technology to real-world problems.
- Universal Design for Learning (UDL) — inclusive learning experiences that accommodate diverse learner needs.
- Technological Pedagogical Content Knowledge (TPACK) — the integration of technology, pedagogy, and subject-matter knowledge.

Rather than replacing these established frameworks, ZLS has the potential to complement them by connecting their broader educational objectives to a structured model of technology-specific knowledge, vocabulary, communication, application, assessment, and recognition.

This creates an opportunity to bridge the gap between knowing about technology, understanding how it works, communicating knowledge effectively, and demonstrating the ability to apply that knowledge.

2. The ZLS ecosystem: Connecting standards to practice

Zengage Learning System (ZLS)

An integrated ecosystem for transformative technology literacy

Transformative Technology Literacy Framework (TTLF)

Defines the competencies, learning progression, and principles for developing and recognizing technology literacy.

TTLMS

40 technology-focused micro courses that develop foundational knowledge across emerging technology fields.

TTLML

A resource library supporting continued learning through articles, tutorials, assessments, and downloadable resources.

Learning Outcomes and Recognition

Knowledge acquisition, communication, practical application, competency assessment, evidence portfolios, and potential academic or professional recognition.

The strength of this architecture lies in its potential to connect educational standards, instructional resources, measurable learning outcomes, and real-world demonstrations of competence within a coordinated system.

3. A competency model for transformative technology literacy

At the center of ZLS is the TTLF, which organizes technology literacy around six core competencies:

Reading - Understand technical terminology, documentation, research, instructions, and technology-related information.

Listening - Comprehend technical explanations, discussions, demonstrations, and spoken information.

Writing - Document knowledge, explain technical concepts, formulate instructions, and communicate solutions.

Speaking - Explain technologies, discuss their implications, and communicate ideas to different audiences.

Technology Fluency - Understand technology concepts, capabilities, limitations, applications, risks, and opportunities.

Articulation - Synthesize and express technology knowledge clearly, accurately, and appropriately in academic and professional contexts.

Together, these competencies provide a basis for considering technology literacy as more than familiarity with digital tools. They support a broader understanding of the learner's ability to comprehend, explain, evaluate, and communicate technology knowledge.

The six competencies could inform future standards-development discussions about common learning outcomes, proficiency indicators, assessment methods, and transferable technology literacy skills.

4. A six-stage progression for developing and recognizing literacy

The TTLF also organizes the development of technology literacy through six dimensions:

Dimension	Potential function in a standards-aligned system
Defined	Establish the knowledge, competencies, and performance expectations learners should achieve.

Acquired	Develop knowledge through structured learning and guided practice.
Demonstrated	Provide evidence of understanding, communication, and application.
Assessed	Evaluate performance against explicit criteria and learning outcomes.
Validated	Establish the credibility and reliability of the evidence and assessment process.
Recognized	Connect demonstrated competencies with appropriate credentials, portfolios, academic credit, or professional opportunities.

This progression provides a conceptual structure for connecting curriculum design to evidence of learning and potential recognition.

For wider adoption, each dimension would benefit from clearly specified criteria, documented assessment procedures, quality assurance, and transparent recognition policies. Such work could help make the model more comparable and usable across institutions and jurisdictions.

5. Potential contributions to global standards development

ZLS could contribute to the ongoing evolution of transformative technology literacy education in several important ways.

1. Connecting existing standards to emerging technologies

ZLS could help translate broad educational principles into learning outcomes for AI, quantum computing, biotechnology, robotics, immersive technologies, and other rapidly evolving fields.

2. Advancing a shared vocabulary for technology literacy

The TTLMS and [TTLML](#) resources could support the development of terminology, comprehension, and communication competencies that help learners and educators discuss emerging technologies more consistently.

3. Supporting competency-based assessment

The TTLF could provide a foundation for developing observable learning outcomes, performance indicators, assessment rubrics, and evidence-based portfolios.

4. Strengthening academic and career mobility

By connecting learning with demonstrable competencies, ZLS could support discussions about transferable skills, prior learning assessment and recognition (PLAR), workforce preparation, and pathways into further education.

5. Enabling international collaboration

Through research partnerships, pilot implementations, and cross-cultural validation, ZLS could help educators explore common principles for technology literacy while allowing adaptation to local languages, educational systems, and workforce needs.

These are potential contributions, not claims that ZLS has already been adopted or endorsed by international standards organizations. Its influence would depend on evidence of effectiveness, stakeholder participation, independent evaluation, and engagement with relevant standards-development communities.

6. From an emerging model to a potential global reference

To develop ZLS into a credible contributor to global standards development, Zengage Learning could pursue a structured pathway.

1. Document the model. Publish the TTLF's definitions, competency descriptions, learning progression, assessment principles, and alignment methodology.
2. Map standards systematically. Create detailed crosswalks linking TTLF outcomes to ISTE, UNESCO ICT-CFT, NAEP, UDL, TPACK, and relevant emerging technology standards, identifying both alignment and gaps.
3. Pilot the system. Work with schools, colleges, universities, employers, and professional learning organizations to evaluate its usefulness across different settings.
4. Validate learning outcomes. Gather evidence of learner progress, assessment reliability, accessibility, practical application, and transfer of knowledge between technology fields.
5. Develop shared benchmarks. Use research findings and expert consultation to propose proficiency descriptors, performance tasks, and assessment criteria that can be compared across contexts.
6. Engage international stakeholders. Share findings with educators, researchers, professional associations, employers, and appropriate standards-development bodies for review and potential collaboration.

This pathway would help distinguish ZLS as a developing educational model from a formally recognized international standard.

It would also establish a stronger evidence base for evaluating whether its framework can be adapted, replicated, and used across diverse learning environments.

7. The broader significance of ZLS

The long-term opportunity for ZLS is to help advance a more comprehensive understanding of technology literacy: one that integrates technical knowledge with the ability to read, listen, write, speak, apply, and articulate that knowledge in meaningful contexts.

In this vision, technology literacy becomes a foundation for academic participation, professional development, responsible technology use, innovation, and lifelong learning—not simply a collection of isolated technical skills.

The Zengage Learning System's integrated architecture offers a potential mechanism for connecting educational standards with learning resources, measurable competencies, assessment, and recognition. Its continued development could contribute useful ideas, research, and implementation models to the broader international conversation about preparing people for an increasingly technology-driven world.

Ultimately, ZLS has the potential to evolve from an emerging, standards-aligned educational ecosystem into a recognized contributor to the research, practice, and collaborative development of global transformative technology literacy standards.

Realizing that potential will require sustained research, independent validation, transparent assessment, inclusive implementation, and meaningful engagement with the international education and standards communities.

Overview of Transformative Technology Literacy Microlearning Series (TTLMS)

