世界数字教育联盟
WORLD DIGITAL EDUCATION ALLIANCE

PROPOSAL FOR THE ESTABLISHMENT OF AN INTERNATIONAL DIGITAL EDUCATION STANDARDS FRAMEWORK

·2025·

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To All Alliance Members and Global Partners,

Digital technologies are profoundly reshaping the global education ecosystem, creating new opportunities to advance educational equity and quality. However, challenges such as the digital divide, uneven resource distribution, and the lack of unified standards continue to hinder the development of digital education and international collaboration. In response, the World Digital Education Alliance (WDEA) proposes to establish an "open, inclusive, and sustainable" *International Digital Education Standards Framework* (Attachment 1) to foster a global consensus to accelerate the digital transformation of education toward greater heights.

The proposed standard framework encompasses key domains of digital education, including educational content and resources, platforms and tools, educational data, as well as security and ethics. It is intended to guide the standardization within the alliance to regulate the application of digital technologies among member organizations with standards. It aims to promote the sharing of educational resources and foster collaborative innovation in technology, thereby contributing to global educational equity and high-quality development. Concurrently, the framework encourages the alliance members to explore and implement standardization practices adapted to the specific needs of their regions and organizations.

The establishment of an international digital education standards system is a long-term and complex endeavor that requires the joint participation and continuous efforts of educational communities, industries, authorities, and all sectors of society. To this end, we sincerely call on all alliance members and global partners to actively engage in digital education standardization activities. We need to strengthen coordination in policy, technology, resources, and talent development to inject strong momentum into the development of digital education. Under the collaborative efforts and guidance of the alliance, we are committed to providing educational opportunities that are more inclusive, efficient, and of the highest quality to every individual who aspires to learn and grow. Our goal is to ensure that digital education not only benefits the world but also significantly enhances the well-being of all humanity.

Secretariat of the World Digital Education Alliance
May 16, 2025

Attachment 1

INTERNATIONAL DIGITAL EDUCATION

STANDARDS FRAMEWORK 2025

1. BACKGROUND

Along with the rapid growth of information technology, digital education has become a crucial engine for various transformational experiences in global education, providing innovative pathways to achieve the United Nations Sustainable Development Goal (SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). In the digital era, technologies such as big data analytics, AR/VR, blockchain, artificial intelligence, and the metaverse have profoundly transformed traditional educational models, promoting equity, quality, and efficiency in education. However, countries and regions face significant challenges in developing digital education, including regional disparities, insufficient interconnectivity, and lack of standards, which hinder the transformation and further development of digital education.

To address these challenges, the secretariat of the World Digital Education Alliance (WDEA) has initiated a proposal, urging member organizations to collaborate and reach a consensus to establish an "open, inclusive, and sustainable" standards framework for digital education. This framework aims to guide the standardized application of digital technologies among member organizations, promote the sharing of educational resources and collaborative technological innovation, and support the equitable and high-quality development of global education.

2. SCOPE

This document defines the principles for establishing the digital education standards system, outlines its reference framework with detailed descriptions of each component, and provides guidelines for the localized application of these standards.

This document applies to the planning, development, and maintenance of the WDEA's standards for digital education, and serves as a reference to guide the standardization efforts of member organizations in digital education.

3. FUNDAMENTAL PRINCIPLES

When establishing the digital education standards framework, it is essential to adhere to the following fundamental principles, and these principles ensure its effectiveness in supporting standardization efforts in digital education, meet the diverse needs of the stakeholders, and adapt to the evolving technological and societal contexts.

(1) Human-Centric Approach

The standards framework must prioritize educational objectives, respect the autonomy and individualized development needs of learners, and promote equitable and efficient education. Technology should serve educational goals first, addressing the needs of learners, educators, administrators, and the broader public.

(2) Comprehensive and Systematic Design

The framework should coordinate the entire lifecycle, multi-stakeholder engagement, and multi-dimensional perspectives of digital education. By encompassing core elements such as instructional resources, technological tools, participants, it must address the differentiated requirements of various educational stages or scenarios, including basic education, higher education, vocational education, lifelong education, thereby establishing a logically coherent and hierarchically structured standards framework.

(3) Culturally Adaptability and Neutrality

Standards development and implementation must account for regional disparities in educational systems, technological readiness, governance models, and cultural contexts. Neutrality should be upheld to ensure compatibility with their diverse legacy technological ecosystems, societal environments, and developmental priorities.

(4) Global Collaboration

WDEA are taken as platforms to engage global stakeholders collaboratively to create, share, and mutually recognize digital education standards. It should ensure alignment between the WDEA standards and existing international standards, universal regulations, and industry best practices.

(5) Adaptability and Future-Readiness

The framework should be dynamic and forward-looking, reflecting the evolving trends in technology. It must address the application and standardization requirements of cutting-edge technologies, such as artificial intelligence, virtual reality, metaverse, robotics, and LLMs, in educational scenarios. By being adaptable to technological advancements and rapid iterations, the framework ensures its advancement and sustainability.

4. ARCHITECTURAL FRAMEWORK AND COMPONENTS

4.1 CORE LOGIC

The digital education ecosystem is a complex system composed of multiple key elements, including participants, activities, resources, and environments, with their core interactions illustrated in Figure 1.

- The *participants* in digital education engage in educational *activities* that collectively form distinct educational *processes*.
- These *activities* are conducted within specific *environments*, generating diverse educational *data*. *Data* can also directly drive the *environments* to accomplish specific tasks. New information generated during *activities* is systematically provided as feedback to the *participants*.
- The environments encompass three dimensions: (a) Spaces *and Facilities*, (b) Platforms *and Tools* (software), (c) Resources *and Content*. Their interrelation can be described as follows: relying on *Spaces and Facilities*, utilizing *Platforms and Tools*, and consuming certain *Resources and Content*.

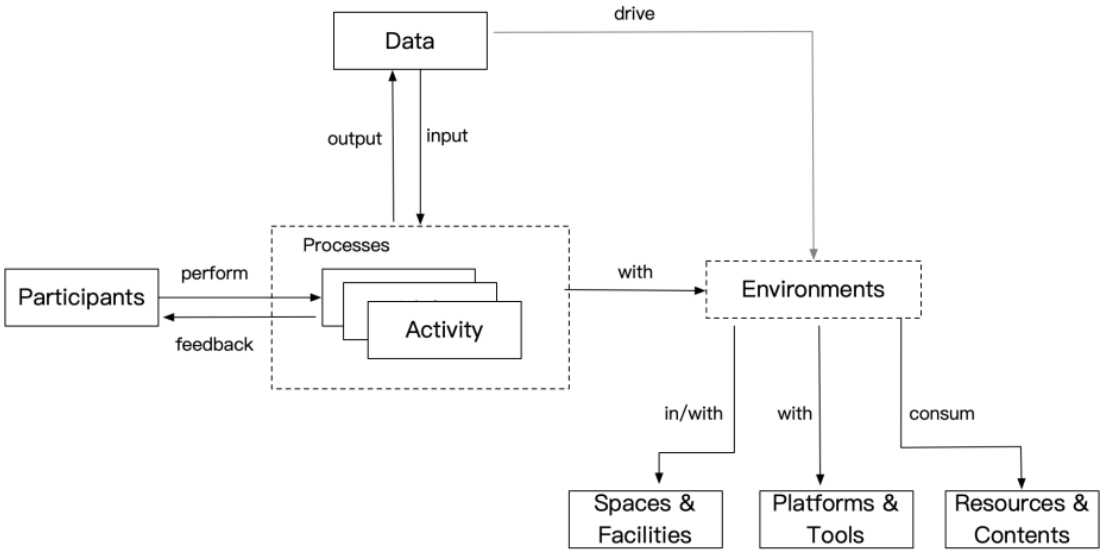

Figure 1: Core Components and Relationships in Digital Education

Additionally, participants engage in a specialized activity as "services and assessments", which optimizes and refines all elements of the digital education ecosystem through data insights. Each digital education practice is ultimately tailored to one or more educational stages (e.g., basic education) or a specific domain.

4.2 FRAMEWORK ARCHITECTURE

By decoupling and synergistically realigning standards based on a multi-dimensional perspective, we have developed a reference framework for the digital education standards, as depicted in Figure 2. Each digital education standard can be categorized into a specific cell within the framework, or it may span across multiple cells, depending on its scope and applicability.

The reference framework horizontally (x-axis) divides the standards into ten distinct business domains by core education elements: Terminology and Standards Framework; Participants; Activities and Procedures; Data; Resources and Contents; Spaces and Facilities; Platforms and Tools; Services and Assessments; Security, Privacy and Ethics; and AI in Education. These domains will be elaborated in Section 4.3. Each digital education standard is primarily assigned to a single domain. However, cross-domain categorization is permitted when the scope and applicability of the standard justify its inclusion in multiple domains.

The vertical dimension (Y-axis) organizes the standards into three business layers:

(1) Common Standards

This layer extracts universal technical models that define core data structures and interface specifications, providing foundational technical support for the entire system.

(2) Application Standards

This layer specifies technical specifications and functional requirements for specific hardware and software systems, guiding the design and development of educational technology products.

(3) Operational Protocols

Building on the first two layers, this layer of process and compliance standards ensures deployment quality, operational security, and sustainable educational practices.

The third dimension (Z-axis) divides standards by educational stages/scenarios: basic education, vocational education, higher education, lifelong education, and so on. Specialized standards are developed to address the unique requirements of each educational stage/scenario. This dimension provides education authorities with the means to propose and govern technical standards tailored to their specific needs.

Examples:

Vocational education curriculum frameworks, Learner profiling for basic education, Development specifications for basic education resource repositories.

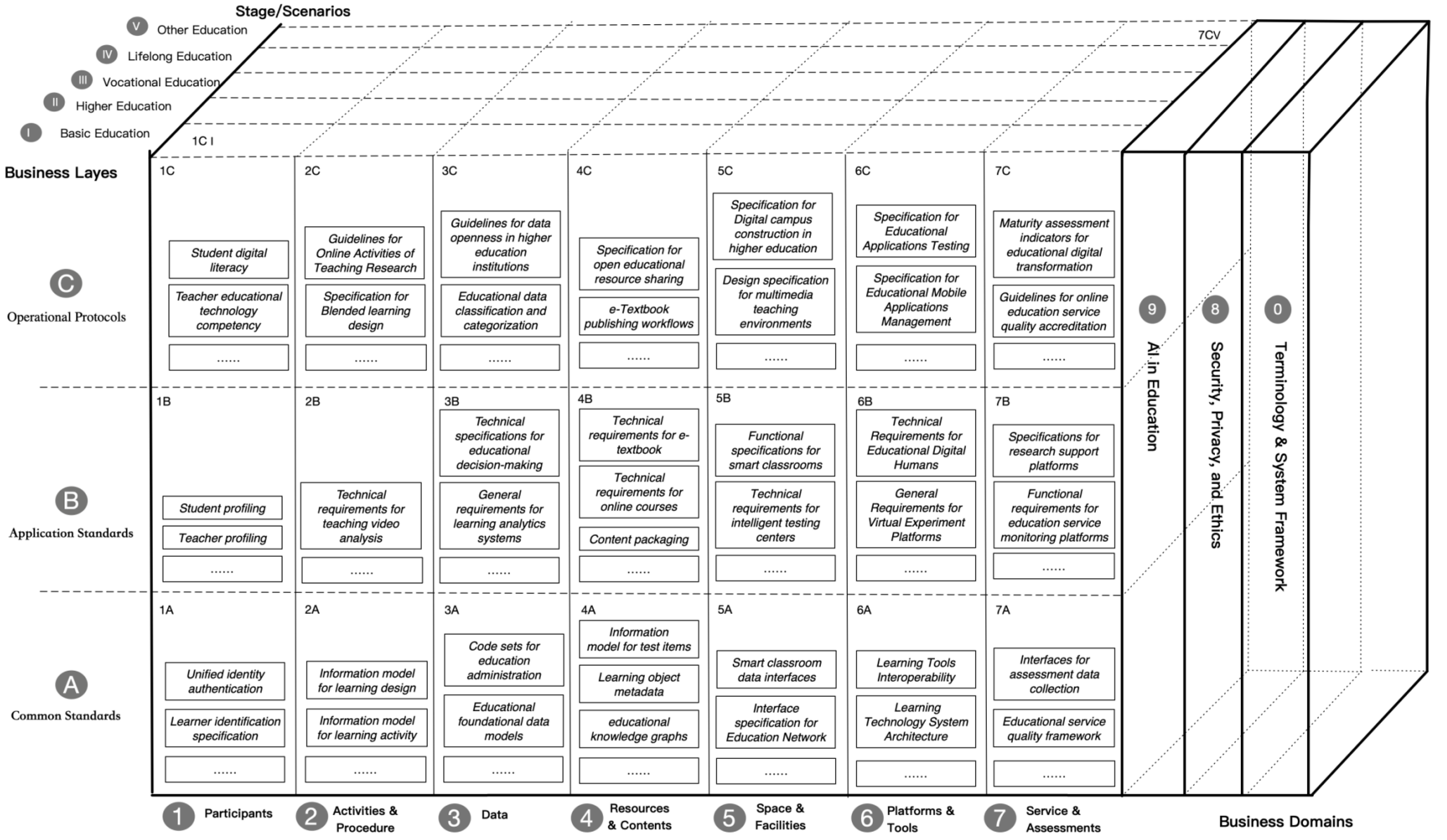

Figure2. A Reference Framework for Digital Education Standards

4.3 BUSINESS DOMAINS AND EXAMPLES

Descriptions and examples for the ten business domains along the x-axis of Figure 2 within the reference framework are listed below.

(0) Terminology and Standards Framework

This section focuses on the meta-model construction of the standards system. It defines global conceptual frameworks and foundational constraints, providing semantic consistency benchmarks and logical anchors for the entire system. These standards exhibit meta-standard attributes, unifying common elements across sub-systems through abstract modeling.

Examples:

Terminology standards, Standards framework, Guidelines for standardization activities

(1) Participants

This section defines role models and interaction rules for participants in the digital education ecosystem, covering both individual roles (such as teachers, students and administrators) and organizational entities (such as governments, schools, enterprises, and third-party service providers).

Examples:

- Common Standards: *Unified identity authentication, Learner identification specification, Teacher identification specification*
- Application Standards: *Learner profiling, Teacher profiling*
- Operational Protocols: *Student digital literacy, Teacher educational technology competency, Educational content provider qualification and certification*

(2) Activities and Procedures

This section focuses on abstraction, modeling and structured description of activities in digital education environments. It covers multiple types of activities (such as learning, teaching, and classroom assessment), core pedagogical phases (including instructional design, resource preparation, implementation, and feedback), and multimodal interactions (such as online-offline integration, human-AI collaboration).

Examples:

- Common Standards: *Information model for learning activity, Information model for learning design*
- Application Standards: *Technical requirements for teaching video analysis, Technical requirements for teaching log analysis*
- Operational Protocols: *Specification for blended learning design, Guidelines for online activities of teaching research, Guide on learning behavior data collection*

(3) Data

This section establishes unified technical specifications and governance frameworks for diverse procedural and outcome data generated in educational contexts, including data from administrative management, digital campus, and research activities. These standards ensure compliant data collection, trusted circulation, in-depth analytics, and proper utilization across the digital education ecosystem.

Examples:

- Common Standards: *Educational foundational data models, Higher education management information, Code sets for education administration*
- Application Standards: *General requirements for learning analytics systems, technical specifications for educational data analysis and decision-making*

- *Operational* Protocols*: Guide on data openness in higher education institutions, Educational data classification and categorization*

(4) Resources and Content

These standards constitute a comprehensive technical and managerial system governing the creation, description, organization, and sharing of digital educational resources. This domain encompasses: content description standards (e.g., learning resource metadata, knowledge graph description model), content technical specifications (e.g., specification for content packaging), and content management protocols. Their core mission is to ensure the discoverability, interoperability, and reusability of educational resources.

Examples:

- Common Standards*: Learning object metadata, Educational knowledge graphs, Information model for test items*
- Application Standards: *Content packaging, Technical requirements for online courses, Technical requirements for e-textbook*
- Operational Protocols: *e-Textbook publishing workflows, Guidelines for open educational resource sharing*

(5) Spaces and Facilities

As the foundation for integrating physical and digital spaces in education, these standards regulate entity environments, smart devices, and network infrastructures across educational scenarios. They aim to establish secure, intelligent, interconnected, scalable, and future-ready educational infrastructure. The core goal is to accelerate the integration of pedagogical spaces with digital technologies to support personalized learning and intelligent administration.

Examples:

- Common Standards*: Interface specification for Education Private Network, IoT middleware interfaces for campus, Smart classroom data interfaces*
- Application Standards*: Technical requirements for intelligent testing center, Functional specifications for smart classrooms*
- Operational Protocols*: Design specification for multimedia teaching environments; Specification for Digital campus development*

(6) Platforms and Tools

Platforms and tools include software technologies, platforms, and instruments that support learning, teaching, and administrative activities. By standardizing the technical architectures, functions, interoperability interfaces, and tool applications of digital education systems, these standards establish an open, interconnected, data-interoperable, smart, agile, trustworthy, and controllable educational technology foundation. Their core value lies in seamlessly connecting humans, resources, and environments across educational scenarios, providing robust software support for digital education.

Examples:

- Common Standards*: Learning tools interoperability, Learning technology system architecture, Classification codes for platform and tool*
- Application Standards: *General requirements for virtual experiment platforms, Technical requirements for educational digital humans*
- Operational Protocols*: Specification for educational mobile applications management, Specification for educational application testing*

(7) Services and Assessments

These standards formalize service management across domains such as teaching, research, and administration. They regulate service delivery, including administrative services, support services, training services, non-academic assessment activities, and associated technologies within educational organizations. They construct a human-centric, measurable and reviewable, and dynamically optimized educational service system.

Examples:

- Common Standards*: Educational service quality framework, Interfaces for assessment data collection*
- Application Standards: *Functional requirements for education service monitoring platforms; Specifications for research support platforms*
- Operational Protocols: *Guidelines for online education service quality accreditation; Maturity assessment indicators for educational digital transformation*

In addition to categorizing standards in the framework described above, standards can also be organized into thematic series focused on specific domains. These domains typically represent priority areas of interest for industries or educational administrative bodies during a particular period. Examples include smart education platforms, educational artificial intelligence, or digital human technologies in education. Relevant standards under the existing framework, such as those related to participants, data, resources, tools, and evaluation, can be extracted and consolidated into a standalone series. This approach supports focused standardization efforts within these specific areas of digital education. Item 8 and 9 below, represent two thematic standard series.

(8) Security, Privacy, and Ethics

These standards form the fundamental safeguard framework for digital education systems. By establishing technical specifications and governance mechanisms for cybersecurity, privacy protection, and ethical constraints, these standards balance technological innovation with humanistic values. They are helpful in creating reliable, trustworthy, and sustainable digital environments for all educational participants, including teachers, learners, and administrators. These standards are crucial for all educational activities and permeate the entire digital education ecosystem.

Examples:

Cybersecurity classification protection for education; General requirements for learner personal information protection; Educational data security risk assessment specifications

(9) Artificial Intelligence in Education

This thematic category standardizes the multi-level, multi-scenario applications of AI technologies in education. It covers standardization requirements from technical frameworks to practical implementations, including standards to regulate AI applications in teaching, learning, assessment, research, and administration, as well as evaluation criteria and governance protocols for AI-enabled educational systems.

Examples:

Large model for education, Assessment specifications for AI in education, Guidelines for AI-driven instruction

5. LOCALIZATION AND APPLICATION PROFILES

All the WDEA standards are recommendatory in nature. Alliance members are encouraged to selectively adopt and implement them to their specific needs. The digital education standards in this framework

should maintain a comprehensive, flexible, and inclusive structure to accommodate the diverse needs of member organizations in culture, political systems, scale, and stages of digital technology maturity. For specific standards, a "Standards + Application Profile" approach can be used to create a system that is both adaptable and operational, ensuring alignment with the Alliance consensus while supporting the localized implementation by member organizations.

When drafting standards, editors should adopt a layered design approach for technical requirements, which are divided into three groups as below.

(1) Core Items

These are the minimum compliance requirements recommended for all member organizations, such as data encryption and fundamental privacy protection clauses. This item group forms the technical foundation to ensure the interoperability of digital education software systems, as well as the openness and sharing of educational resources.

(2) Enhanced Items

These are technical or management enhancements that member organizations can choose based on their capabilities, such as implementing complex functions of a particular learning tool. Requirements in this item group aim to help member organizations further enhance the quality and standardization of digital education.

(3) Exploratory Items

These are advanced technical practices encouraged for members with advanced technical capabilities and resources. Requirements in this item group aim to drive innovation and development in digital education among member organizations and lead industry trends.

For each standard, member organizations may use a "requirements matrix" to tailor the specific standard clauses they need to follow. They can then compile an application guide in localized languages and contexts, customized to meet the needs of their institution, as illustrated in Table 1.

Table 1 Requirements Matrix in an application profile (example)

	Requirement 1	Requirement 2	Requirement 3	...	Requirement n
exploratory items	-	Optional	-	...	Mandatory
enhanced items	Optional	Mandatory	Optional	...	Mandatory
core items	Mandatory	Mandatory	Mandatory	...	Mandatory

For example, suppose a standard defines technical requirements for *n* different aspects in a specific domain. For each aspect, the technical requirements are tagged into three item groups above: core, enhanced, and exploratory items, based on the complexity and necessity of implementation. When WDEA members localize this standard, they can use a Requirements Matrix, similar to Table 1, to determine which technical requirements they need to meet. For instance, for Requirement 1, when implementing the standard, all core items must be fully implemented (mandatory), enhanced items can be implemented depending on the specific situations (optional), and exploratory items are exempted. For Requirement 2, both core and enhanced items must be fully implemented (mandatory), while the exploratory items are subject to the circumstances (optional).

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