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Artificial intelligence application system in education

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Foreword

This document was drafted in accordance with the provisions of World Digital Education Alliance(WDEA) Standardization Committee Operation Procedure.

Please note that some contents of this document may involve patent rights, and the publishing authority of this document shall not be held responsible for identifying patent rights.

This document was proposed by and is under the jurisdiction of the World Digital Education Alliance.

Introduction

In recent years, the application of artificial intelligence technologies in the education sector has continued to deepen, reshaping teaching approaches, learning models and forms of instructional assessment/evaluation. The United Nations Educational, Scientific and Cultural Organization (UNESCO), the Organization for Economic Co-operation and Development (OECD), and other countries have successively issued policy documents and research reports, emphasizing that, while advancing AI-enabled educational innovation, due attention should be paid to system security, data protection, algorithmic transparency, fairness and ethical governance, in order to promote the responsible use of artificial intelligence in education. Against this background, there is an urgent need to establish unified and implementable technical specifications to support the standardized construction and orderly development of artificial intelligence education application systems.

At present, artificial intelligence education application systems are gradually being explored and applied innovatively in scenarios such as teaching, learning and assessment/evaluation, supporting the intelligentization of teaching processes, the personalization of learning, and improvements in the efficiency of educational assessment/evaluation. However, functional constraints are lacking in terms of system architecture, functional boundaries, security protection and ethical constraints, and further improvement is required. Based on the principle of being human-centered, education-led, and grounded in trustworthy technology, this document aims to develop the core competencies required for individual lifelong development and social development, namely correct values, essential character, and key competencies. This document focuses on supporting technologies, general functions, and security and ethical requirements for artificial intelligence education applications, and establishes a systematic reference framework and basic technical specifications, clarifying the key capabilities and constraints that such systems are expected to have.

This document is developed under the organization of the World Digital Education Alliance Standards Committee and is intended to provide guidance for the design, development, testing, deployment and evaluation of artificial intelligence education application systems within the Alliance. The development of this document is expected to enhance the quality, security and trustworthiness of artificial intelligence education application systems, and to promote educational equity and the improvement of educational quality. At the same time, it can provide a unified technical reference for industrial research and development, product evaluation and international cooperation, thereby supporting the healthy development of industries related to artificial intelligence education applications and generating positive social and economic benefits.

Artificial intelligence application system in education

1 Scope

This document establishes a system reference framework for artificial intelligence application systems in education, provides basic requirements for educational application support technology functions, general functions for educational scenarios, safety and ethics functions.

This document is applicable to the design, research and development, testing, application, and evaluation of artificial intelligence application systems in education within the Alliance.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC TR 20748-1, *Information technology for learning, education and training — Learning analytics interoperability*

ISO/IEC TR 24028, *Information technology — Artificial intelligence — Overview of trustworthiness in artificial intelligence*

ISO/IEC 42001:2023, *Information technology — Artificial intelligence — Management system*

WDEAS 0001—2025, *Large model for education—Overall reference framework*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

artificial intelligence

<discipline> research and development of mechanisms and applications of artificial intelligence systems (3.2).

Note: Research and development can take place across any number of fields such as computer science, data science, humanities, mathematics and natural sciences.

[Source: ISO/IEC 22989:2022(E), 3.1.3, modified.]

3.2

artificial intelligence system

engineered system that generates outputs such as content, forecasts, recommendations or decisions for a given set of human-defined objectives.

[Source: ISO/IEC 22989:2022(E), 3.1.4, modified.]

3.3

artificial intelligence application system in education

application system with artificial intelligence (3.1) capabilities, intended for educational services.

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Note : Provides educational services such as teaching, learning, assessment/evaluation for artificial intelligence education activities.

3. 4

agent in education

automated entity in the field of education that perceives its environment, responds to it according to the requirements of educators, and takes actions to achieve objectives set by educators.

[Source: ISO/IEC 22989:2022(E), 3.1.1, modified.]

3. 5

virtual human in education

computer-generated virtual character designed for fulfilling educational requirements, driven by humans or computations, and presented on multimodal output devices for instructional purposes.

3. 6

logical inference

Inference from given premises using logical elements such as symbols, predicates, functions, and quantifiers to draw conclusions.

3. 7

knowledge graph

collection of knowledge elements and their connections described in a structured form.

3. 8

ethics

<artificial intelligence> moral norms or principles followed in the basic research and application practice of artificial intelligence (3.1) technology.

4 Symbols and abbreviated terms

AI Artificial Intelligence

AR Augmented Reality

VR Virtual Reality

XR Extended Reality

5 Foundational Principles

5. 1 Technology for social good

The AI application systems in education shall support the responsible and beneficial use of artificial intelligence technologies. It shall incorporate value-oriented guidance in educational applications and establish collaborative governance and risk early-warning mechanisms to guide the use of artificial intelligence technologies maintains appropriate direction, healthy content and positive educational orientation, thereby fostering a healthy, orderly and responsible AI-enabled educational ecosystem.

5.2 Human-centered education

The AI application systems in education shall adhere to pedagogical principles and the laws of human physical and cognitive development. It shall support the principle that education serves human development and that technology functions as a tool, guiding teachers and students to develop values, essential character traits and key competencies required for living and learning in the intelligent era during the use of artificial intelligence technologies.

5.3 Human autonomy

AI application systems in education shall function as tools to support, rather than replace, human decision-making. The principles set out in ISO/IEC TR 24368 may be referenced.

5.4 Inclusiveness and equity

The AI application system in education shall take into account learners' cognitive development levels and individual differences, and clearly define the scope and boundaries of system use. It shall guide the AI technologies provide equitable benefits to different regions, schools and individuals, and provide accessible services for users with physical or cognitive disabilities. It shall support efforts to reduce disparities in educational opportunities among urban and rural areas, regions, schools and population groups, thereby promoting educational equity.

5.5 Dependency principle

The dependency principle shall be addressed from two perspectives:

- a) **Educator responsibility:** For any functions that may affect instructional decisions, learning pathways, educational records, or assessment outcomes, qualified educators shall retain decision-making authority, the right to review system outputs, and the authority to override or intervene in system operations.
- b) **Learner cognitive responsibility:** For cognitive, creative, reasoning, or evaluative tasks designated for learning or assessment purposes, the AI application system in education shall not substitute for learners in completing such tasks.

5.6 Safety and controllability

A lifecycle-wide dynamic assurance mechanism covering content security, data security, ethical safety, and risk prevention and control shall be established to ensure the safe, reliable, and healthy development of artificial intelligence technologies in education.

6 System reference framework

The reference framework for the AI Education Application System is illustrated in Figure 1, comprising General Key Technology Layer, Education Application Support Technology Layer, c) Educational Application General Function Layer, and Safety and Ethics Support Layer. The framework should be designed to allow updates or extensions in response to technological developments and evolving application requirements. The layers are described below:

- a) **Education Application General Key Technology Layer:** Covers the key technologies involved in this document, including machine learning, computer vision, knowledge graphs, large models,

pattern recognition, intelligent agents, natural language processing, embodied AI/robot, intelligent speech, etc. Description of the above key technologies is not further provided in this document.

- b) **Education Application Support Technology Layer:** Provides foundational technical capabilities to support artificial intelligence educational application systems at all levels and types, including language understanding, logical inference, content recognition, content retrieval, content generation, knowledge question answering, automatic coding, agent in education, digital human in education, intelligent assessment, adaptive learning, etc. (See Clause 7).
- c) **General Function for Educational Scenarios Layer:** Includes general functions such as teacher teaching, student learning, assessment and evaluation (See Clause 8).
- d) **Safety and Ethics Support Layer:** Includes safety and ethics, providing guidance for the Education Application Support Technology Layer, and General Function Layer (See Clause 9).

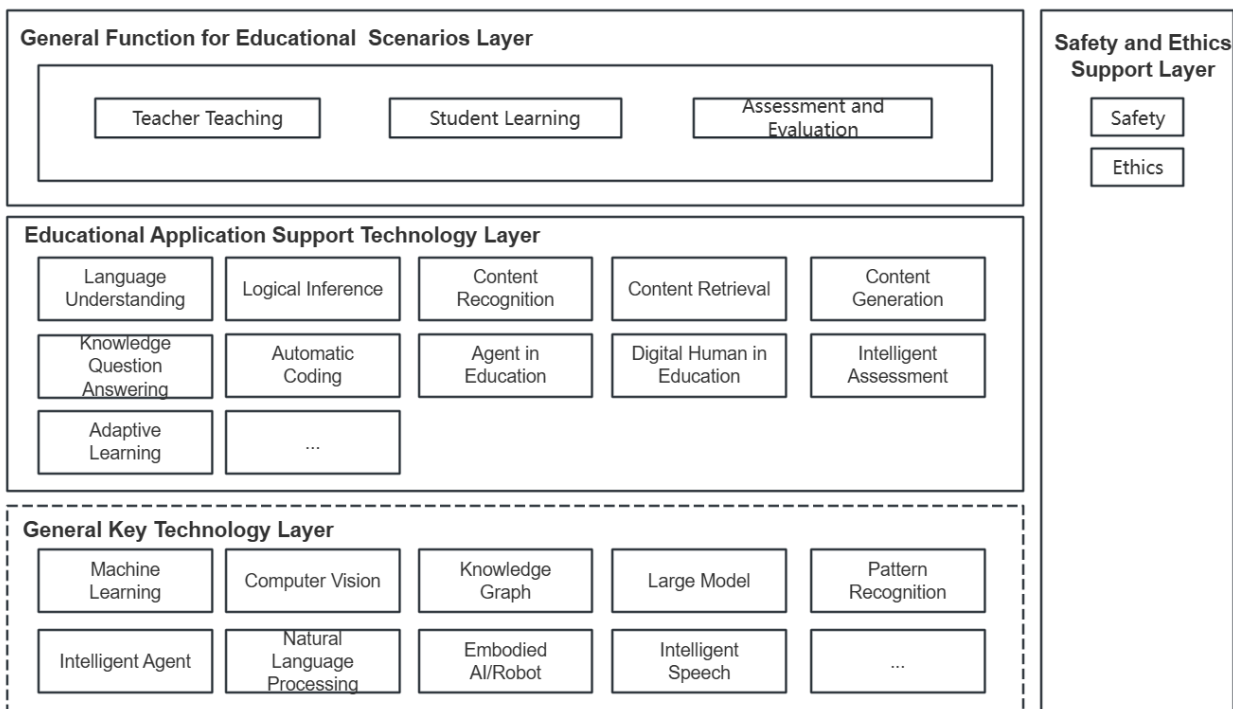


Figure 1 — Reference framework for the AI application system in education

7 Education application support technology functions

7.1 Language understanding

The basic functions of language understanding are as follows:

- a) Machine Translation: Can translate natural language text.
- b) Grammar Checking: Can identify and correct grammatical mistakes.

- c) Semantic understanding of classical literature: Can interpret classical literary works and providing corresponding analysis.
- d) Dialogue Understanding: Can understand information from two ways and multi-party dialogues in various scenarios, supporting context understanding, coreference resolution, semantic disambiguation, etc.
- e) Reading Comprehension: Can comprehend discourse, including understanding words, sentences, writing techniques, central ideas, and value orientations. Can accurately analyze the relationships and hierarchy between paragraphs and chapters, summarize the central content of articles, and evaluate writing methods and linguistic features.

7.2 Logical inference

Based on general capabilities including deductive, inductive, probabilistic, and fuzzy logic, the basic functions of logical inference are as follows:

- a) Scientific Inference: Can derive principle-based conclusions through generalization, abstraction and deduction based on relevant scientific knowledge, experimental findings, ect.

Example 1: In physics instruction, the relationship between air pressure and boiling point can be explained by applying two principles, which are “the boiling point of water at standard atmospheric pressure is 100°C” and “the lower the air pressure, the lower the boiling point”. The system can deduce that in high-altitude regions, the boiling point of water falls below 100°C.

- b) Spatiotemporal Inference: Can make inferences about objects that occupy space and change over time.

Example 2: In a physics experiment, students can predict the object’s motion trajectory by inputting parameters such as velocity and direction into a simulation system.

- c) Associative Inference: Can comprehend, analyze, and provide extended extrapolate about a given subject or time.

Example 3: During instruction, the AI can recommend additional relevant knowledge when the teacher circles text on the blackboard. For instance, while explaining a historical event, the AI can associate related background information, subsequent impacts, similar events, etc., thereby enriching instructional content, helping students develop more integrated knowledge frameworks, and fostering their logical and associative thinking skills.

- d) Mathematical Inference: Can derive mathematical symbols and solve quantitative logic, including formula operations, theorem proving, equation solving, probabilistic-statistical inference, etc.

Example 4: When students input a geometry proof problem (e.g., “prove that the midsegment of a triangle is parallel to the third side”), the AI can identify the given graphic conditions and problem statement, invoke a geometric axiom database, and progressively derive the proof steps. Simultaneously, it annotates each step with its justification (e.g., “parallel line criterion,” “property of congruent triangles”), thereby assisting students in understanding the inference logic.

7.3 Content recognition

The basic functions of content recognition are as follows:

- a) Text Recognition: Can recognize both handwritten and printed text, as well as identify individual students’ handwriting based on personal features.

- b) **Subject-Specific Text Recognition:** Can recognize and process discipline-specific text.

Example 1: The system can recognize discipline-related text such as handwritten mathematical formulas, geometric figure, chemical equations, physical formulas, etc.

- c) **Speech Recognition:** Can recognize common languages including Chinese and English, and convert speech into text.

Example 2: The system can convert the reading of a Chinese textbook into text, identifying errors such as mispronunciations and omissions.

- d) **Graphic and Image Recognition:** Can perform object detection, image classification, semantic segmentation and semantic understanding on graphics and images.
- e) **Video Recognition:** Can identify students' behaviors, states, and teaching segments in instructional videos, and match them with relevant knowledge points.

7.4 Content retrieval

The basic functions of content retrieval are as follows:

- a) **Multi-dimensional Tag Retrieval:** Can accurately retrieve content through tags such as subject, grade level, knowledge points, difficulty level, question type, teaching methods, etc.
- b) **Learning Behavior Data-based Retrieval:** Can analyze learning behavior data (e.g. browsing history, dwell time, interaction records, practice accuracy, etc.) to retrieve highly relevant adaptive learning materials.
- c) **Fuzzy Retrieval:** Can interpret the intent of fuzzy queries and retrieve relevant content by spelling error tolerance, partial character matching, etc.
- d) **Example:** When a student searches for content on deposition within the topic of phase changes but enters a misspelled Chinese character, the system uses fuzzy retrieval to automatically match relevant materials such as instructional videos, knowledge summaries and practice exercises.
- e) **Multimodal Content Retrieval:** Can retrieve multimodal content from input text, images, or speech.

7.5 Content generation

The basic functions of content generation are as follows:

- a) **Multi-genre Generation:** Can generate texts with specific genre characteristics (poetry, prose, novels, argumentative essays, news reports, etc.) and reconstruct the text expression forms.

Example 1: Generate three passages on the topic "Artificial Intelligence and the Future of Humanity," each in a different style: a Shakespearean sonnet style, a minimalist prose style in the manner of Ernest Hemingway, and a hard science fiction essay style in the manner of Isaac Asimov.

- b) **Discipline-differentiated Content Generation:** Can generate differentiated content adapted to discipline characteristics and teaching objectives.

Example 2: Create a popular science story on the theme "The Little Green Leaf Factory," using personification to explain how plants use sunlight to "produce food," with a focus on stimulating interest and intuitive understanding.

- c) **Structured Content Generation:** Can automatically integrate fragmented information into structured content.

Example 3: Generate structured content such as mind maps, Excel files or knowledge graphs based on the given content.

- d) **Multimodal Content Generation:** Can generate multimodal content including texts, images, videos, audios, etc.

7.6 Knowledge question answering

The basic functions of knowledge question answering are as follows:

- a) **Discipline Knowledge Question Answering:** Can align with the specific subject areas and grade levels, delivering precise and reliable answers.
- b) **Learning Situation Adaptive Question Answering:** Can generate targeted responses to the personalized context of each query.
- c) **Interdisciplinary Knowledge Integration:** Can integrate interdisciplinary knowledge to generate appropriate responses to comprehensive practical questions;
Example: Provide an initial proposal for the interdisciplinary topic of “establishing sustainable cities in arid regions” by integrating multidisciplinary knowledge.
- d) **Chain-of-Thought Question Answering:** Can produce thinking paths or inference chains in natural language, decompose a multi-step inference problem into sequential steps, and derive the final answer via incremental inference;
- e) **Mistake Diagnosis:** Can analyze incorrect answers to identify the underlying causes, and provide the correct thinking logic and answers.
- f) **Multimodal Knowledge Question Answering:** Can conduct interactive question answering using multimodal data such as voice, images, or video content.
- g) **Positive Incentive:** Can provide responses using encouraging and constructive language during question answering.

7.7 Automatic coding

The basic functions of automatic coding technology are as follows:

- a) **Code Generation:** Can generate objective-aligned, syntactically correct and operational basic code examples from natural-language pedagogical requirements.
- b) **Code Completion:** Can complete missing code in programs and provide corresponding explanations.
- c) **Code Evaluation and Grading:** Can detect syntax errors, logic errors, and compliance issues in given code, locate the corresponding positions, and provide modification suggestions.
- d) **Code Analysis and Explanation:** Can analyze the rationality of code structure design, and explain its execution logic along with potential optimization pathways.

7.8 Agent in education

The basic functions of the agent in education are as follows:

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- a) **Role Configuration:** Can configure agent roles flexibly to adapt to diverse instructional scenarios (such as teacher, teaching assistant, peer learner, facilitator, etc.).
- b) **Tool Scheduling:** Can automatically invoke and coordinate appropriate external tools (such as programming platforms, data visualization tools, search engines, virtual laboratories, etc.) to complete learning tasks in line with teaching objectives and learning tasks.
- c) **Dynamic Planning:** Can perform adaptive learning planning—including task decomposition, path formulation, and resource allocation—to develop and dynamically tune personalized learning paths based on student objectives, current state, available resources, and ongoing feedback.
- d) **Initiative Interaction:** Can proactively initiate interactions to provide learning feedback, suggestions or encouragement based on students' status, learning behaviors, current cognitive level and learning tasks.

Example: The system guides reflection after incorrect answers by prompting recall of similar problems from prior lessons, or provides positive feedback upon task completion by praising the student for delivering clearer analysis than before.

- e) **Collaborative Learning:** Can facilitate collaboration, discussion and collective knowledge construction among students in multi-participant learning environments.

7.9 Digital human in education

The basic functions of an educational digital human are as follows:

- a) **Avatar Creation:** Can create user avatars (e.g., student, teacher, administrator) based on instructional scenarios and role specifications.
- b) **Multimodal Interaction:** Can support interactions with users or within the educational environment by adapting to the instructional scenario and assigned roles.
- c) **Affective Computing:** Can recognize learners' emotional states (e.g., confusion, anxiety, engagement) based on multimodal data and provide appropriate empathetic feedback or adaptive support in accordance with instructional needs.

7.10 Intelligent assessment

The basic functions of intelligent assessment are as follows:

- a) Can supports comprehensive, scenario-adaptive, and multi-dimensional assessment across various contexts (e.g., for different subjects and educational stages).
- b) Can support automatic scoring of various question types (e.g., objective, subjective and programming) and input formats (e.g., oral, handwritten and visual).
- c) Can dynamically adapt assessment strategies based on individual differences.

7.11 Adaptive learning

The basic functions of adaptive learning are as follows:

- a) Can construct multidimensional competency profiles and generate personalized data reports.
- b) Can create knowledge graphs.

- c) Can dynamically plan learning paths.
- d) Can recommend personalized exercises, learning materials, and related content.

8 General function for educational scenarios

8.1 Teacher Teaching

In terms of Teacher Teaching, the system design includes the following basic functions:

- a) Teaching Content Preparation
 - 1) Learner Profile and Competency Analysis: The system can interface with data from scenarios such as assignment submission, pre-study feedback, and classroom interactions. It can construct multi-dimensional learner profiles and knowledge graphs based on the data, accurately analyze students' mastery of knowledge points and the distribution of weak areas, and generating personalized learner reports.
 - 2) Resource Adaptation: Based on subject, curriculum plans and standards, textbooks, context, user behavior, and search history, the system can assist teachers in aggregating teaching resources; match learning resources needed for personalized tutoring plans for students; and recommend differentiated instructional activity designs and tiered questioning strategies for teachers.
 - 3) Resource Generation: In response to teachers' needs, the system can support generating digital educational resources according to teaching objectives and key/difficult points entered by teachers, including courseware, instructional design plans (automatically parsing textbooks and curriculum standards, and, together with teachers' uploaded PPTs or manuscripts, generating lesson plans consistent with instructional logic, including teaching suggestions and teaching phases/steps), hands-on training tasks, assessment rubrics, exercises and test items, etc.
 - 4) Teaching Resource Management: The system can support convenient access to and intelligent distribution of teaching resources; intelligent development, management, and reuse of teaching resources; support automatically matching basic teaching resources (e.g., presentation templates and item banks) based on the textbook outline; and support keyword-based retrieval by chapter for various publicly available open-course resources.
 - 5) Intelligent Lesson Preparation: Can invoke subject-specific intelligent agents based on instructional tasks to collaboratively complete multi-step, domain-specific lesson planning activities, decompose instructional objectives, orchestrate multimedia resources and interactive tools, and generate lesson plans.
- b) Teaching Implementation
 - 1) Instructional Content Recognition: During interaction on teaching terminals and large classroom displays, the system can intelligently recognize elements of instructional content to support classroom instruction, standardized board presentation, and the presentation of instructional content.
 - 2) Teaching Information Interaction: Can provide assistance for teacher–student interaction, student–student interaction, and human–computer interaction.
 - 3) In-class Intelligent Question Answering: Can provide knowledge Q&A related to instructional content, and shall be able to quickly retrieve, integrate, and present relevant knowledge in a structured manner.

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- 4) **Digital Human Teaching:** The system can provide virtual avatars suitable for teaching scenarios, with capabilities including human-computer dialogue and knowledge explanation.
 - 5) **Training/Practical Activity Adaptation:** Can transform real industry/enterprise projects into teaching cases, integrate immersive interaction technologies (VR/AR/XR), and design practical teaching activities such as virtual simulation or remote training.
- c) **Post-class Assignments and Tutoring**
- 1) **Assignment Generation:** Based on analyses of learning situation, exam situation, textbooks, curriculum standards, and teaching habits, as well as corresponding curriculum standards and educational/teaching requirements, the system can automatically generate assignments and support human-AI co-creation of assignments.
 - 2) **Differentiated Assignments:** Based on students' learning abilities, mastery of knowledge points, weak points, etc., the system can generate differentiated assignments for multiple student groups.
 - 3) **Assignment Submission:** Can provide students with multiple formats and channels for submitting assignments.
 - 4) **Intelligent Grading:** Can automatically grade common question types across common subjects, and provide error localization and brief explanations.
- d) **Teaching Research and Reflection**
- 1) **Classroom teaching behaviour analysis:** Shall be capable of collecting classroom data and intelligently analysing teaching behaviours to provide data support for evidence-based teaching research supported by artificial intelligence.
 - 2) **Teaching Research resources:** Can automatically tag uploaded resources and provide teachers with the necessary knowledge and relevant resources to support teaching research.
 - 3) **Teaching Research Tools:** Can provide distinctive teaching research tools, e.g., various educational technology tools and micro-lesson authoring tools.
 - 4) **Research Assistant:** Can provide full-chain support from topic ideation and outline construction to generating project proposal (initiation) and project closing reports, with built-in plagiarism/similarity checking and paraphrasing support, and compliance checking for citation and reference standards.

8.2 Student Learning

In terms of Student Learning, the system design includes the following basic functions:

- a) **Learning Pathway Planning**
- 1) **Learning Objective Setting:** Can propose phased learning objectives based on course requirements and student competencies, and define specific task units that constitute the recommended objectives;
 - 2) **Personalized Pathway Generation:** Can generate personalized learning pathways by integrating student competencies and learning objectives, ensuring alignment with intended learning outcomes and expected learning timelines, including the sequencing of knowledge elements and corresponding knowledge progression pathways, and can track and provide reminders on the attainment of learning objectives;

- 3) Resource Retrieval and Recommendation: Can automatically deliver personalized learning resources aligned with individualized learning plans, provide a learning resource repository, and support intelligent resource retrieval, personalized recommendation, online learning, and personal knowledge base management;
 - 4) Learning Progress Adjustment: Can dynamically perceive students' learning progress and status, and adjust learning pace and task intensity based on the perceived results, while ensuring alignment with intended learning outcomes and expected instructional timelines.
- b) Intelligent tutoring
- 1) Intelligent Question Answering: Can support natural language interaction between students and the system, enabling question-and-answer exchanges on knowledge content, learning difficulties, problem-solving approaches and extracurricular extensions. The responses provided by the system can adopt a guided reasoning approach and avoid directly presenting final answers.
 - 2) Intelligent Learning Companion: Can provide continuous companion-based learning services around course learning, including real-time question answering, learning progress and task reminders, learning method guidance and suggestions, and foundational support. The system can recommend learning peers, form learning groups, and provide online discussion and collaborative learning tools.
 - 3) Writing and Expression Support: Can provide guidance on task interpretation, structural prompts, content recommendations and language refinement suggestions in writing tasks. Such functions can cover the entire process from ideation to text production.
 - 4) Programming Guidance: Can provide appropriate programming guidance for students with different programming needs.
 - 5) Knowledge Organization: Can provide tools for organizing students' knowledge states, such as mind maps, structural diagrams and flowcharts.
- c) Learning feedback
- 1) Intelligent Assignment grading: Can identify and grade both objective and subjective items, automatically analyze solution steps, the rationality of problem-solving approaches and error types, and provide targeted explanations and improvement suggestions.
 - 2) Essay Assessment: Can perform basic error detection and correction (e.g., spelling, grammar, and punctuation), provide feedback on aspects including theme, logical structure and rhetorical techniques, and generate scores and suggestions. The system can track multiple revision records and provide guidance.
 - 3) Resource recommendation: shall be capable of recommending similar variant exercises, tutoring resources, and explanatory videos based on learners' learning behaviors.
 - 4) Learning Strategy Guidance: Can provide suggestions on learning methods, attention guidance or time-planning prompts based on students' behavioral patterns and stage-based feedback.

8.3 Assessment and Evaluation

In terms of Assessment and Evaluation, the system design includes the following basic functions.

- a) Diagnostic Assessment

- 1) Learning Status Diagnosis: Can identify students' learning foundations, cognitive misconceptions and learning difficulties, construct student knowledge graphs, and automatically generate student diagnostic reports.
 - 2) Learning Status Early Warning: Can establish academic risk models, and send early warning notifications to relevant stakeholders for students identified as having potential academic difficulties in accordance with predefined rules.
- b) Formative Assessment
- 1) Speaking Assessment: Can recognize, analyze and evaluate oral performance in terms of pronunciation accuracy, speaking fluency and coherence, vocabulary and grammatical accuracy, completeness of expression and logical coherence.
 - 2) Teaching Behavior Analysis: Can support the analysis of teaching behavior data (e.g. question distribution and feedback timeliness) and generate improvement suggestions (e.g. "increase the frequency of example demonstrations during the course").
 - 3) Unstructured Data Integration: Can transform non-standardized information, such as peer assessment records from group collaboration, photographs from practical activities and learning portfolios, into structured data suitable for analysis.
- c) Summative Assessment
- 1) Item Development and Test Assembly: Can generate assessment items and test papers aligned with students' learning status by considering class-level weak knowledge areas and scoring rates, and by incorporating current affairs topics, real-life scenarios or scientific narratives.
 - 2) Intelligent Marking: Can automatically assess common item types across subjects and provide error localization and diagnostic feedback, and can scan and capture information from paper-based test papers, automatically assess them, and restore handwritten traces.
 - 3) Traceability: can scan, assess, and record processing traces for completed paper-based test papers.
 - 4) Error analysis: can accurately identify and classify incorrect responses, automatically generate learner-specific error collections, and provide corresponding attribution analysis.
 - 5) Academic evaluation: can support teachers in assessing constructed-response items, essays, and student work, support consistency checks against learners' current performance levels, and support diagnosis of academic issues, with evaluation algorithms, criteria, and weightings remaining transparent and explainable, and with functions provided for teacher review and adjustment of evaluation results.

9 Safety and ethics functions

9.1 Network Safety

In terms of safety, the design of the entire lifecycle of the system, including its design, development, deployment, operation and disposal, shall be in accordance with ISO/IEC TR 24028. The system design shall include the following basic functions:

- a) System Safety

- 1) AI application systems in education shall employ a locally and independently deployed architecture or logical isolation for components handling educational application data.
 - 2) Implement effective security policies and protective measures to safeguard instructional activities shall against threats such as malicious programs (e.g., tampering with intelligent assignment grading results), and data poisoning (e.g., contaminating personalized learning recommendation data sources).
 - 3) Shall implement identity authentication (e.g., account password combined with campus identity authentication) and a corresponding access control mechanism for users of the AI application system in education.
 - 4) Shall establish a fast recovery mechanism for failures occurring for the AI application system in education.
- b) Data Safety
- 1) Personal information shall be processed in compliance throughout its lifecycle, including collection, storage, processing, use, and dissemination, to ensure the confidentiality, integrity, and availability of data.
 - 2) Shall establish a data backup and recovery mechanism.
 - 3) System content shall be produced and collected in accordance with laws and regulations.
 - 4) Shall avoid infringement of intellectual property rights. Prompt users of infringement risks before performing relevant operations such as content application, copying and export.


9.2 Ethics

In terms of ethics, the system design which shall be in accordance with the requirements specified in ISO/IEC 42001, include the following basic functions:

- a) Fairness: Shall ensure fair treatment for all users in teaching resource recommendation and generation, and reduce unfairness caused by gender, race, region, special group status, etc.
- b) Transparency: Shall ensure transparency in data sources, algorithms, decision rules, and access controls across the system lifecycle (e.g., data collection, algorithm design, model training, operational rules), and shall provide standardized interfaces (e.g., APIs) to support interoperability and seamless data exchange between heterogeneous AI educational systems and service providers.
- c) Explainability: Shall provide causal explanations or rule clarifications for learning path recommendations, assignment grading, student evaluation, and other decision-making processes. For high-stakes academic decisions, shall provide comprehensive and traceable logical evidence chains to support decision outcomes, to increase transparency and reduce the risk of “black-box” algorithmic bias.
- d) Controllability: Shall ensure that the behavior outcomes and potential risks arising from the operation of AI technology can be effectively understood, intervened in, managed, and constrained by relevant educational participants, developers, and users.
- e) Algorithmic diversity and anti-filter bubble: Shall optimize recommendation and generation logic to ensure the diversity and balance of output content, proactively mitigate the filter bubble effect through the introduction of dissenting content, interdisciplinary perspectives, and random exploration mechanisms, and support users in independently adjusting or disabling personalized recommendation algorithms.

Bibliography

- [1] ISO/IEC 22989:2022(E) Information technology — Artificial intelligence — Artificial intelligence concepts and terminology
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