

Ministry of Education Guidelines for Digital Teaching in Senior High School Level or Below



Version 3.0

Digital

Teaching

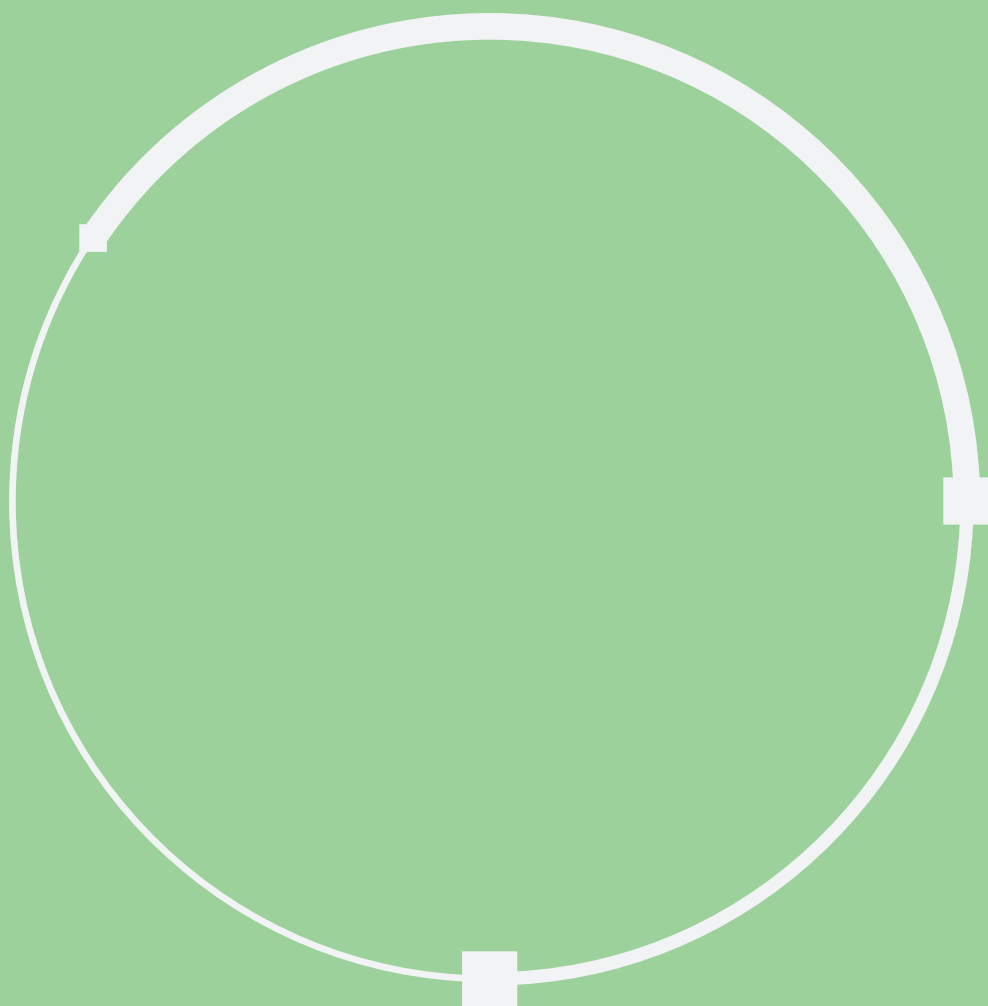


August, 2024

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Minister's Foreword

Following the launch of ChatGPT in late 2022, the wave of Generative AI (GenAI) has rapidly swept across the global education sector, steering digital education towards more personalized, intelligent, and globalized development. The current AI trend has transformed digital teaching models and course design, enriched learning experiences, and redefined the future of teaching and learning.

In order to help global education systems, and adapt to and integrate AI technology, UNESCO released the Guidance for Generative AI in Education and Research in September 2023. Additionally, UNESCO plans to launch AI competency frameworks for school students and teachers during the Digital Learning Week in September 2024. These initiatives aim to ensure that both teachers and students possess the necessary ethical awareness and standards, enabling them to use AI tools safely and meaningfully across various fields, thereby fostering understanding, application, and innovation in learning.

Drawing on international experience, the Ministry of Education (MOE) places significant emphasis on the critical roles of principals, teachers, and parents, with an extended digital learning system from the classroom to the home. To complete the aspects of school leadership, course design, teaching, and parenting, the MOE has compiled and expanded the three guidelines of Digital Learning Leadership Guide, Digital Teaching Guide v3.0, and Parent Digital Learning Guide. These endeavors are aimed at fostering a conducive learning environment wherein students feel secure, teachers remain focused, and parents experience peace of mind.

Expanding upon the concept of a "fundamental, universal, and practical handbook" from previous iterations, the Digital Teaching Guide v3.0 is designed to assist educators in planning and implementing digital instruction. The updated version adds new elements, including an overview of the AI learning companion built into the MOE "Adaptive Learning" website and precautions concerning AI-related risks, and principles for AI-assisted teaching. These new features not only provide teachers with the latest digital tools and application principles but also help them to incorporate diverse perspectives and cross-disciplinary integration into their classrooms. The guidelines further extend the application of generative AI by providing directives on digital literacy and specific digital teaching strategies, designs, and examples for educators and learners. As a result, this guide becomes a valuable resource for

teachers up to the senior high school level, assisting them in facilitating their skills and implementing digital teaching effectively. It is anticipated that these guidelines will enable educators to adeptly navigate the challenges associated with digital learning and enhance student learning outcomes.

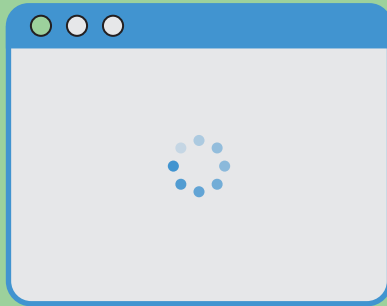
The essence of education lies in inspiring students to engage with and reflect on social issues. In the past, we relied on the transmission of experience; today, with the rise of AI, our minds have become more imaginative. Technology acts like the wind in our sails, propelling us into new territories, while the humanities serve as the anchor for our spirits, grounding us in our heritage as we pursue new horizons. By integrating technology and the humanities, we can equip our children with the wings to soar, guiding them through this digital era filled with challenges and opportunities, enabling them to discover themselves, achieve their aspirations, and become global citizens with a spirit of exploration, innovative thinking, and practical skills. The MOE sincerely hopes that every educator can fully utilize the Digital Teaching Guide v3.0, fearlessly exploring and consistently innovating amid the digital generations, creating more fulfilling learning experiences for students, and collectively taking education to the next level. Let's come together to embrace the promising future of digital education.



Dr. Ying-Yao Cheng,
Minister of Education

August 2024

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Digital Teaching

The image features a minimalist design with a light orange background. A dark orange line starts from the top right, moves left, then down, then left again, ending in a rounded corner. A small dark orange square is positioned at the intersection of the horizontal and vertical segments of this line. In the bottom left corner, there is a vertical dark orange bar.



Digital Learning Trends and Vision



This section provides an overview and analysis of recent international digital learning trends and policy vision. It highlights the key points and outcomes of the Ministry of Education's "Digital Learning Enhancement Plan". In addition to aligning with international digital learning developments, it also presents the Republic of China (R.O.C., Taiwan)'s digital learning vision and policy characteristics.

I Digital Learning Trends

The global wave of digitalization is driving digital learning, with countries emphasizing personalized learning devices, AI-assisted teaching, and digital literacy to promote educational equality and improve teaching quality.

- (1) Emphasizing the use of devices for personalized learning and promoting the "one student, one device" policy.
- (2) Introducing artificial intelligence into digital learning platforms; developing digital content to provide free and diverse learning resources.
- (3) Using technology to enhance academic subjects and core competencies, and proposing the concept of digital literacy along with related digital learning guidelines.
- (4) Enhancing teachers' abilities to integrate AI-assisted teaching into academic learning and effectively utilize technology in student-centered assessments.
- (5) Applying big data in policy-making and improving teaching to achieve personalized and adaptive learning.

In the era of digital learning and AI, the essence of learning is being redefined, driving the transformation and upgrading of education. Through the creation of equitable learning environments and the enhancement of digital literacy, we aim to cultivate lifelong learners with critical thinking and innovative abilities, thereby shaping a fair educational ecosystem.

- (1) **Universal and Equitable Learning Environments:** Implementing the "one student, one device" policy ensures that every student has access to equitable, free digital learning resources and quality educational opportunities.
- (2) **Personalized and Adaptive Learning Experiences:** Using digital and AI tools on learning platforms, along with diverse digital content, to provide personalized learning paths tailored to each student, and thereby enhancing their self-directed learning abilities.
- (3) **Comprehensive Enhancement of Digital and AI Literacy:** Strengthening the digital and AI literacy of both teachers and students to foster critical thinking, innovative application, and ethical awareness, enabling students to solve problems using digital tools and AI technology.
- (4) **Innovative Teaching Models and Gap Reduction:** Leveraging AI technology to revolutionize learning methods, providing real-time feedback to help every student realize their full potential, and ensuring that all students can experience personalized learning.
- (5) **Educational Transformation and Collaborative Innovation Ecosystems:** Encouraging teachers to use AI-assisted teaching, redefining the role of teachers as facilitators, promoting professional development, and establishing collaborative learning communities to jointly drive educational innovation.

3 Implementation Results of the "Digital Learning Enhancement Plan"

From 2022 to 2025, the Ministry of Education has been promoting the "Internet for Every Classroom, Tablets for Every Student" policy, ushering in a new era of digital learning.

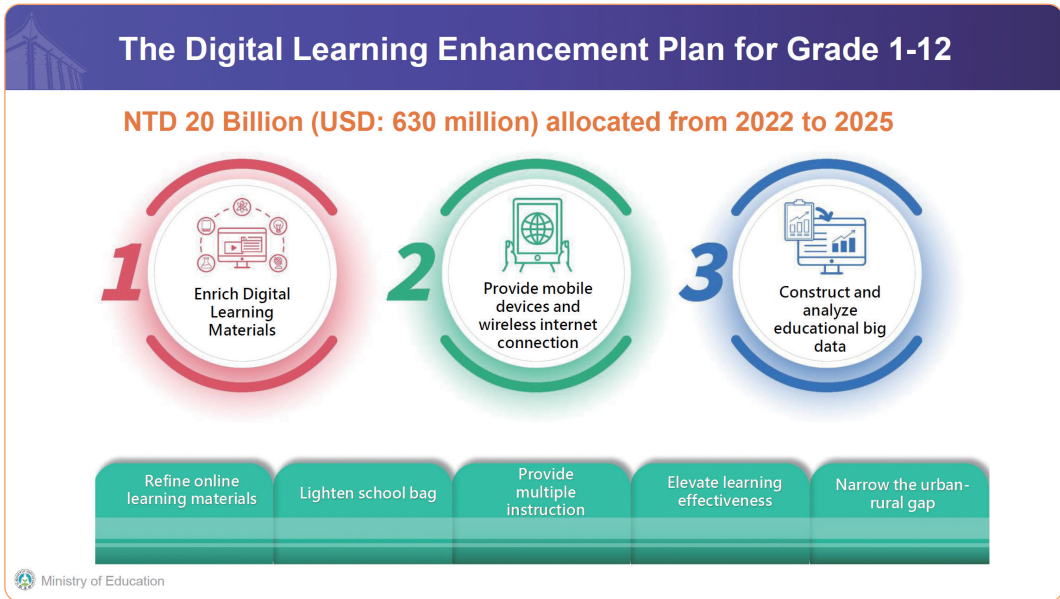


Figure 1-1

(1) Enhancement of Mobile Devices and Internet Access

- In remote schools, every teacher and student are provided with a personal device, while non-remote schools receive one device for every six classes based on the number of classes.
- Subsidies have been provided to local governments to establish Digital Learning Promotion Offices to manage administrative tasks, teaching support, and network maintenance.
- A comprehensive digital teaching enhancement training mechanism for in-service teachers has been planned, aiming to complete basic training for 100% of teachers (196,000 teachers) by 2024.
- Digital Teaching Guidelines have been developed to assist teachers in selecting appropriate digital tools and materials for differentiated teaching while planning and implementing digital instruction.



Figure 1-2

(2) Enrichment of Digital Learning Content

- A "Campus Digital Content and Teaching Software Procurement List" has been announced, including 283 vendors and 2,652 products, with subsidies provided for schools in various cities and counties to purchase necessary digital content and teaching software.
- 176 sets of subject digital teaching materials have been produced, presented through videos, animations, e-books, game-based or simulated interactions, and these materials have been included in the "Adaptive Learning" website (<https://adl.edu.tw/HomePage/home/>) and the "Cloud Edu" website (<https://cloud.edu.tw/>), available for free for teachers and students.
- The Cloud Edu website has been established, collecting digital resource tools and services suitable for use by below high school level teachers and students, all of which can be used in conjunction with subsidized devices.



(3) Education Big Data Analysis

- An AI-powered intelligent learning platform, in line with international digital learning trends, has been established, allowing students to have more effective learning experiences through big data-driven learning path diagnostics.
- Students who fell behind in learning who had used the Adaptive Learning website (教育部因材網) for more than 4 hours showed an increased pass rate in subject tests for Chinese, English, and Math by 15.3%, 17%, and 18.4%, respectively, compared to students who did not use the platform.
- An education big data analysis system (including a database) has been established, integrating data from 10 platforms across the Ministry of Education and city and county governments into the education big data database.
- Subsidies have been provided to universities to offer micro-courses on education big data, cultivating talent in education and data analysis, with a total of 3,068 students enrolled in these courses to date.

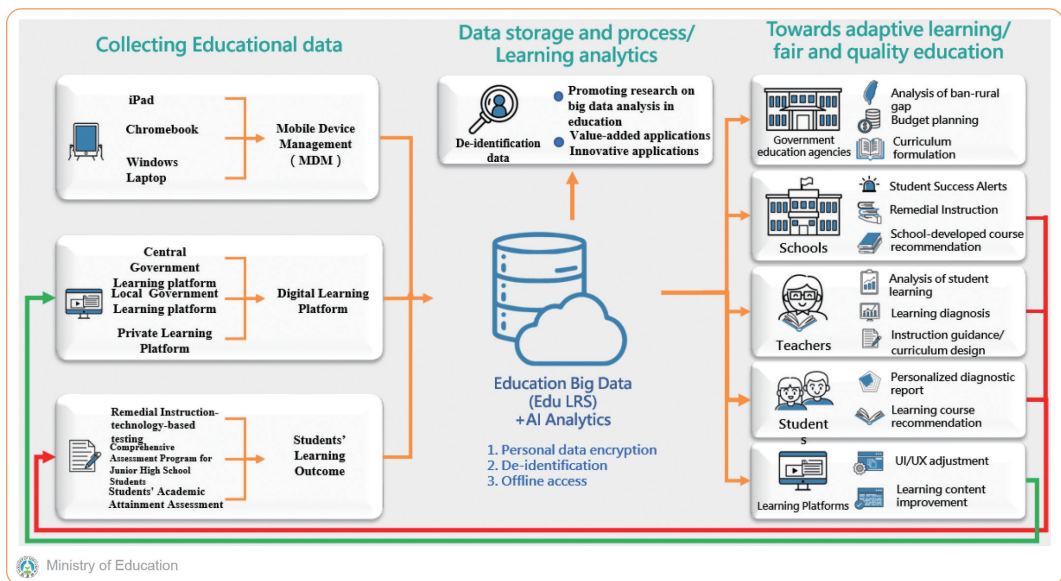


Figure 1-3

Digital Teaching



2



Three Key Concepts: Digital Literacy, Digital Learning, and Digital Teaching



The development of digital technology and artificial intelligence has profoundly impacted education. R.O.C., Taiwan's below high school level education is based on cultivating "digital literacy," which is essential for nurturing lifelong learners capable of adapting to and innovating for the future, as well as supporting each student in various forms of "digital learning" through the design and implementation of "digital teaching" by teachers, and realizing the vision of digital learning.

1 Digital Literacy

Digital literacy refers to the ability to correctly use digital technology and embodies the qualities of a contemporary digital citizen, including:

- (1) Digital safety, regulations, and ethics.
- (2) Digital skills and data management.
- (3) Digital communication, collaboration, and problem-solving.
- (4) Digital content literacy and creation.

2 Digital Learning

Digital learning refers to students' abilities to apply digital literacy and appropriately use digital tools and generative AI resources. Through stages such as goal setting, strategy selection and implementation, assessment and feedback, and adjustment, students develop self-directed learning skills. Based on the varying degrees of teacher and student leadership in the digital learning process, digital learning can be categorized into three different types:

- (1) "Instructive Digital Learning" which is teacher-led
- (2) "Collaborative Digital Learning" which is teacher-student cooperation
- (3) "Self-Regulated Digital Learning" which is student-led

Digital teaching refers to the systematic and appropriate use of digital tools or generative AI by teachers for course planning, instructional design, and implementation. This teaching approach provides students with engaging and diverse learning content, while making abstract concepts concrete and easy to understand. Digital teaching in real-time and smooth classroom interactions allow both teachers and students to monitor learning objectives and progress in real-time. Through the use of digital tools, including digital learning platforms and diagnostic data analysis, digital teaching or even digital tools can help in timely adjustments of teaching and learning strategies.

"Digital teaching" includes the use of digital technology and AI to assist teachers in teaching and integrating methodology into subject instruction (see Figure 2-1).

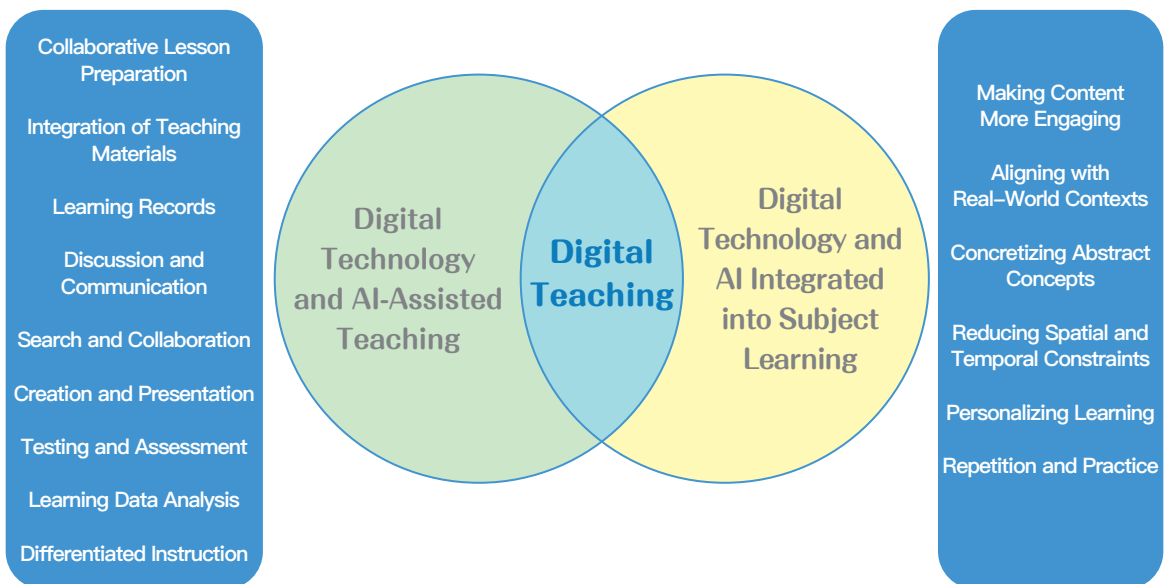


Figure 2-1 → Digital teaching

1 — Digital Technology and AI-Assisted Teaching for Teachers

- (1) **Collaborative Lesson Preparation:** By using the course overview and knowledge structure functions on the Adaptive Learning website, teachers can analyze and plan courses, thereby enhancing lesson planning efficiency. These all help teachers quickly transform the learning objectives of the course.
- (2) **Integration of Teaching Materials:** Utilizing the course package module on the Adaptive Learning website, teachers can integrate digital materials from various sources and formats, producing tailored teaching materials based on student needs.
- (3) **Learning Records:** Assigning learning tasks through digital learning platforms allows teachers to track students' progress through learning records. These platforms also retain the discussions between students and generative AI, helping to identify student misconceptions.
- (4) **Communication and Discussion:** Students can use the domain-specific learning partners on the Adaptive Learning website to appropriately apply questioning strategies for concept clarification or guided use.
- (5) **Searching and Collaboration:** By using AI learning partners on digital learning platforms, students can engage in key questioning, probing, clarifying, and information verification during inquiry processes, aiding in information retrieval and interactive collaboration for cross-curricular content or integration of various topics, developing course content by theme, project, and issue-based topics.
- (6) **Creation and Publication:** Students can use generative AI or graphic and video software to create and publish digital content. Following collaboration with teachers using established rules for generative AI usage, students can explain their work and properly cite references.
- (7) **Feedback and Correction:** Teachers can use assessments on various digital learning platforms to immediately understand students' learning outcomes and difficulties. Additionally, using Socratic Questioning strategies combined with generative AI to make questions and answers, AI tutoring systems can provide personalized feedback and suggestions for further learning.
- (8) **Data Analysis of Learning Progress:** Digital learning platforms and generative AI provide data collection and analysis functions, allowing teachers to understand students' learning conditions, thereby enabling teaching according to students'

aptitudes and abilities. For example, longitudinal diagnostic tests on the Adaptive Learning website help analyze students' learning weaknesses across different grades and suggest personalized learning paths.

- (9) **Differentiated Instruction:** Teachers can combine digital learning platforms with generative AI to adjust teaching strategies to meet the unique needs of each student. However, teachers still need to calibrate these adjustments to effectively implement differentiated instruction.

② — Integration of Digital Technology and AI into Subject Learning

- (1) **Making Content More Engaging:** By using generative AI to create or leverage pre-developed videos, animations, or games, learning can be made more enjoyable.
- (2) **Aligning with Real-World Contexts:** In history or geography courses, AR and VR technologies can be used to transform textbook knowledge into concrete visual and sensory experiences.
- (3) **Concretizing Abstract Concepts:** For example, in a mathematics course, through interactive dynamic geometry software, students can observe the process of line transformation and intuitively understand the changes in slope.
- (4) **Reducing Spatial and Temporal Constraints:** The development of the "e-Du" for education by using generative AI in the Adaptive Learning website in 2024, employing the Socratic Questioning provides appropriate guidance, support, and clarification of concepts or problem-solving processes.
- (5) **Personalizing Learning:** Different subjects or domain areas can use digital tools, including generative AI and digital platforms, to analyze learner performance. Based on individual abilities, needs, and preferences, these tools can offer suitable learning content, adjust learning pace, and personalize learning paths.
- (6) **Repetition and Practice:** One example is using generative AI or the Ministry of Education's Cool English website (<https://www.coolenglish.edu.tw/>) for English pronunciation recognition, students can repeatedly practice and receive immediate correction on their English pronunciation.

Table 2-1 "Digital Technology and AI-Assisted Teaching" and "Digital Technology and AI Integrated into Subject Learning" Design Tools

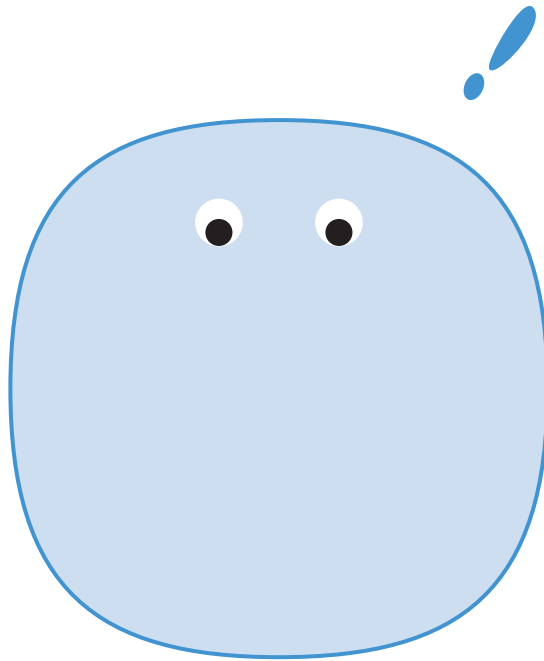
Digital Technology and AI Integrated into Subject Learning		Teaching	
		A Making Content More Engaging	B Aligning with Real-World Contexts
Digital Technology and AI-Assisted Teaching			
Pre-course (I)	1 Collaborative Lesson Preparation	Using digital tools and strategies	
	2 Integration of Teaching Materials		
	3 Others		
In-course (II)	1 Motivation		
	2 Learning Records		
	3 Communication and Discussion		
	4 Searching and Collaboration		
	5 Creation and Publication		
Post-course (III)	6 Testing and Assessment		
	7 Data Analysis of Learning Progress		
	8 Differentiated Instruction		
	9 Feedback and Correction		
	10 Others		

Table 2-1

Digital Technology and AI Integrated into Subject Learning		Teaching	
		C Concretizing Abstract Concepts	D Reducing Spatial and Temporal Constraints
Digital Technology and AI-Assisted Teaching			
Pre-course (I)	1 Collaborative Lesson Preparation	Using digital tools and strategies	
	2 Integration of Teaching Materials		
	3 Others		
In-course (II)	1 Motivation		
	2 Learning Records		
	3 Communication and Discussion		
	4 Searching and Collaboration		
	5 Creation and Publication		
Post-course (III)	6 Testing and Assessment		
	7 Data Analysis of Learning Progress		
	8 Differentiated Instruction		
	9 Feedback and Correction		
	10 Others		

Table 2-1

Digital Technology and AI Integrated into Subject Learning		Teaching		
		E Personalizing Learning	F Repetition and Practice	G Others
Digital Technology and AI-Assisted Teaching				
Pre-course (I)	1 Collaborative Lesson Preparation	Using digital tools and strategies		
	2 Integration of Teaching Materials			
	3 Others			
In-course (II)	1 Motivation			
	2 Learning Records			
	3 Communication and Discussion			
	4 Searching and Collaboration			
	5 Creation and Publication			
Post-course (III)	6 Testing and Assessment			
	7 Data Analysis of Learning Progress			
	8 Differentiated Instruction			
	9 Feedback and Correction			
	10 Others			



- * The tools from Table 2–1 are designed to assist teachers in the design and implementation of their courses by carefully selecting appropriate digital tools (including software, hardware, generative AI, digital platforms, etc.) and strategies according to the pre–course, in–course, and post–course processes. These tools and strategies support teaching and integrate into subject learning to enhance the effectiveness of both teaching and learning.
- * The use of digital tools and strategies should be based on the nature of the course, domain and subject. Digital education technology should be applied appropriately and at the right time to support teaching and learning, enabling Table 2–1 effects to come into full play.

3 — Digital Teaching Strategies

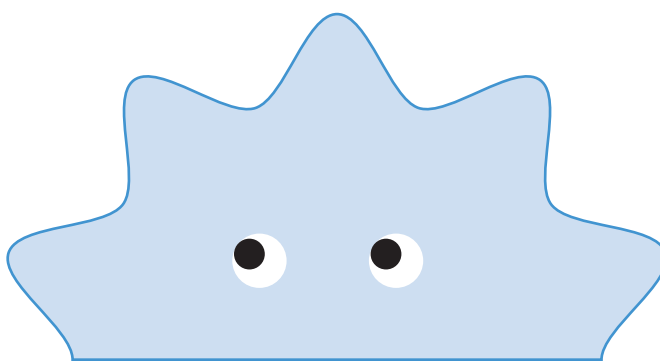
Digital teaching often integrates devices, networks, teaching resources, and learning platforms into various domains. Teachers, based on the learning objectives of the subjects or domains, learning contexts, and students' needs, effectively utilize "flipped classroom", "collaborative learning", "self-directed learning", and "adaptive learning" to implement personalized and adaptive learning.

For example, using the Adaptive Learning website, teachers can foster students' self-directed learning abilities, which include developing self-directed learning-management and time-planning skills. Teachers can apply the Adaptive Learning website's AI learning partner to help students set goals, choose strategies, monitor self-assessment, and regulate their learning. Additionally, the "Four Learning Modes"—student self-learning, co-learning within groups, teacher-guided learning (as needed), and mutual learning between groups—can be applied in the classroom to achieve adaptive learning.

Furthermore, to accommodate different contexts such as distance learning or self-directed learning, teachers can flexibly apply synchronous digital teaching for real-time remote instruction or asynchronous digital teaching to allow students to learn online at their own pace. Moreover, a combination of synchronous and asynchronous, online and face-to-face hybrid digital teaching can transcend traditional classroom formats, thereby enhancing learning outcomes.

Table 2-2 Application of the Four Learning Modes in the Adaptive Learning website

<p style="text-align: center;">Student Self-Learning</p> <ul style="list-style-type: none"> • Teachers assign pre-course tasks, and students engage in pre-study activities to complete the self-learning task list. • Teachers review platform reports and question sections to identify and analyze class-wide and individual student pre-study difficulties. 	<p style="text-align: center;">Co-Learning within Groups</p> <ul style="list-style-type: none"> • Teachers use the Adaptive Learning website to post discussion topics and design task checklists, guiding groups to complete task discussions, achieve common understandings, and upload solutions or work.
<p style="text-align: center;">Teacher-Guided Learning (as needed)</p> <ul style="list-style-type: none"> • Teachers utilize platform data analysis to understand learning outcomes and effectiveness, guiding students in concept clarification, summarizing key learning points, and reflecting on learning outcomes. 	<p style="text-align: center;">Mutual Learning between Groups</p> <ul style="list-style-type: none"> • Each group shares their work and engages in peer review, questioning, communication, and clarification of concepts.





Digital Teaching

3



Practical Digital Teaching for Teachers



Teachers can use the following checklist to inventory digital teaching software and hardware, assess students' digital literacy, and design digital learning outcomes accordingly. Additionally, teachers should evaluate the timing and role of digital technology and AI in assisting teaching and integrating them into subject learning. This would help in grasping the essence of the subject and learning objectives, using digital tools and generative AI to promote personalized and adaptive learning, and fostering students' self-directed learning. Simultaneously, teachers should plan diverse communication channels with parents to enhance parent-teacher-student collaboration, improve learning outcomes, and develop social-emotional learning skills (refer to the appendix for related checklists).

- (1) Before designing digital teaching, teachers can refer to the teaching examples in the appendix of this guide.
- (2) During the digital teaching design process, teachers can self-assess: software and hardware, students' digital capabilities, digital technology and AI integrated into subject learning, digital technology and AI assisting teachers in instruction.
- (3) Application of the Four Learning Modes in the teaching process.
- (4) Engaging in communication and collaboration with parents.
- (5) Paying attention to students' social-emotional learning.



Table 3-1 Self-Assessment Checklist for Digital Teaching Hardware and Software

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> · Ensuring the availability of hardware equipment needed for digital teaching, such as touch screen devices, charging carts, VR headsets, etc. 	
<ul style="list-style-type: none"> · Confirming that the school's IT network can support the entire class being online simultaneously and with access to smooth operation. 	
<ul style="list-style-type: none"> · Selecting digital tools, generative AI, learning resources, or digital learning platforms that meet teaching needs and are age-appropriate. 	
<ul style="list-style-type: none"> · Ensuring that teachers are familiar with the basic functions of digital teaching software, hardware, generative AI, and digital learning platforms. 	
<ul style="list-style-type: none"> · If there are students with special needs in the class, ensuring that teachers can choose appropriate software and hardware and make necessary adjustments to the course and teaching methods. 	

Table 3-2 Student Digital Competences and Literacy Checklist

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> Students can manage their digital tool usage strategies and usage time independently, maintaining physical and mental health. 	
<ul style="list-style-type: none"> Students know how to use digital tools or platforms safely and are attentive to protecting personal privacy online. 	
<ul style="list-style-type: none"> Students can independently operate digital learning platforms and complete learning tasks. 	
<ul style="list-style-type: none"> Students know how to operate the digital tools used in digital teaching, including teaching software, hardware, and generative AI. 	
<ul style="list-style-type: none"> Students can ask questions to generative AI to assist with their learning (paying attention to the issue of age-appropriate materials). 	
<ul style="list-style-type: none"> Students can use digital tools to communicate, collaborate, and solve problems with others. 	
<ul style="list-style-type: none"> Students can follow proper online etiquette during digital interactions and collaborative creation processes. 	
<ul style="list-style-type: none"> Students possess sufficient background knowledge and methods for discerning information sources to judge the accuracy of online information, identify biases, and assess whether there is any violation of basic human rights. 	
<ul style="list-style-type: none"> Students should adhere to the Cyber Security Management Act, Copyright Act, and legal principles when using digital tools and generative AI. They should also protect personal data to avoid misuse when using generative AI. 	
<ul style="list-style-type: none"> Students can use digital tools and generative AI to enhance higher-order cognitive skills, experience thinking and creative processes, and present their work in various formats or performances. 	

Table 3-3 Digital Technology and AI-Assisted Teaching Checklist

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> Ability to use the course frameworks and content of digital learning platforms, or to use generative AI to assist in course planning for enhancing lesson preparation efficiency. 	
<ul style="list-style-type: none"> Ability to apply digital collaboration tools for joint lesson preparation and teaching design discussions and planning. 	
<ul style="list-style-type: none"> Ability to integrate digital teaching materials from different sources and formats into digital teaching courses. 	
<ul style="list-style-type: none"> Ability to discuss and establish guidelines for using digital tools and generative AI with students. 	
<ul style="list-style-type: none"> Ability to use the records and analysis reports from digital tools or platforms to understand students' learning progress and difficulties, and to develop appropriate teaching strategies. 	
<ul style="list-style-type: none"> Ability to use digital tools or platforms to enhance real-time interaction and sharing between teachers and students, thereby resolving learning misconceptions. 	
<ul style="list-style-type: none"> Ability to guide students in using digital tools or platforms for synchronous or asynchronous discussions, interactions, and collaborative editing. 	
<ul style="list-style-type: none"> Ability to use different digital search tools to set appropriate keywords and searches for resources related to course learning. 	
<ul style="list-style-type: none"> Ability to guide students in using digital tools to create, enhancing individual or group creativity. 	
<ul style="list-style-type: none"> Ability to guide students in using digital tools or platforms to present and publish individual or group work. 	
<ul style="list-style-type: none"> Ability to use digital tools or platforms for assessment and to monitor learning performance in real-time. 	
<ul style="list-style-type: none"> Ability to use generative AI for lesson preparation or to integrate age appropriate generative AI into teaching activities. 	
<ul style="list-style-type: none"> Ability to self-assess digital literacy and create professional learning plans for personal and teacher community empowerment. 	

Table 3-4 Digital Technology and AI Integrated into Subject Learning Checklist

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> · Ability to use multimedia or interactive digital teaching materials to enhance students' interest and motivation in learning. 	
<ul style="list-style-type: none"> · Ability to use or create digital teaching materials to concretely present abstract concepts in the domain areas. 	
<ul style="list-style-type: none"> · Ability to select subject-specific digital tools or generative AI based on students' needs and the nature of the subject, and to establish and continuously refine questioning principles and thesauruses. 	
<ul style="list-style-type: none"> · Ability to use or create digital teaching materials to simulate virtual spatial and temporal scenarios, presenting domain-area content, such as historical scenes or the phases of the moon. 	
<ul style="list-style-type: none"> · Ability to use or create digital teaching materials that have collocation with domain-area assessments to achieve mastery learning outcomes. 	
<ul style="list-style-type: none"> · Ability to use or create digital teaching materials to simulate situational arrangements or design, such as virtual laboratories, allowing students to safely conduct practice in potentially hazardous or harmful environments. 	

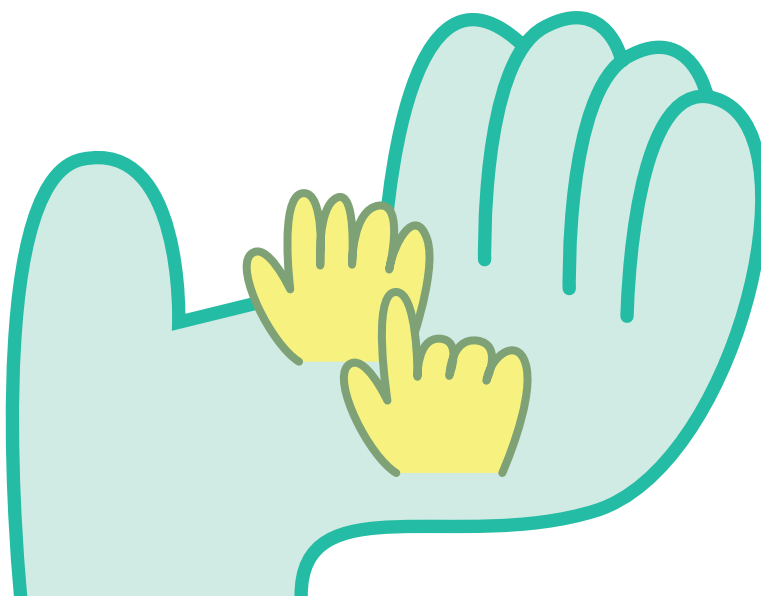


Table 3-5 Technology-Assisted Self-Directed Learning Checklist

Table 3-5		
Learning Method	Checklist Target	Applicable Technology
		✓
Student Self-Learning (Individual)	Students complete the pre-study content.	
	Students record and organize the learning content.	
	Students identify areas of learning difficulty.	
Co-Learning within Groups (Each Group)	Group members verify and supplement each other's answers.	
	Group members collaborate to solve learning difficulties.	
	Group members collaboratively present learning outcomes.	
Mutual Learning between Groups (Intergroup, Whole Class)	Groups compare and analyze each other's learning effectiveness.	
	Groups raise questions and express differing opinions.	
	Groups modify answers based on feedback from other groups.	
Teacher-Guided Learning (Individual, Each Group, Whole Class)	Teacher confirms key learning points and goals.	
	Teacher provides feedback to students based on their difficulties.	
	Teacher summarizes and extends learning.	

Table 3-6 Parent Communication

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> Parents understand the school's plans and relevant policies regarding students' digital learning, such as the "Bring Your Own Device (BYOD)" policy, the "Take-Home Student Device (THSD)" policy, and the school's guidelines on students' use of generative AI. 	
<ul style="list-style-type: none"> During parent-teacher meetings, the school and class digital learning plans and benefits are explained. This includes introducing the purpose of using the Four Learning Modes in digital learning and how it supports learning. Additionally, simple language is used to help parents understand their role and where parental cooperation is needed. 	
<ul style="list-style-type: none"> Collecting parents' concerns and providing feedback to the school as a reference for planning relevant support measures. 	
<ul style="list-style-type: none"> Combining school publications, parent association activities, school parent-teacher days, etc., to address parents' concerns by offering thematic reports, digital learning experiences for parents, or parent empowerment workshops. 	

Table 3-7 Home Digital Learning Environment and Resources

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> Understand each student's home digital environment and equipment, provide necessary support resources, and design both common and differentiated learning plans to ensure equitable learning opportunities and resources for all students, thereby reducing learning disparities. 	
<ul style="list-style-type: none"> Schools communicate with parents and students to ensure mutual understanding of learning expectations and needs, as well as how to assist with individual special needs. 	
<ul style="list-style-type: none"> Conduct digital teaching of open courses for parents, gather their perspectives and needs, and further provide digital learning-related consultations or support for software and hardware for both parents and students 	

Table 3-8 Supporting Students' Social-Emotional Development Needs

Key Self-Assessment Points	✓
<ul style="list-style-type: none"> • The homeroom teacher can write a letter or record a video to send to all students before the school year begins, fostering a sense of team spirit. Additionally, consider establishing class groups and setting rules for group management. 	
<ul style="list-style-type: none"> • Use digital tools or AI to generate strategies that guide emotional learning, such as designing reflective journals, planning collaborative learning projects to build positive relationships, and inviting students to share their favorite thing or a moment when they felt happy, sad, proud, or angry. 	
<ul style="list-style-type: none"> • Design activities that give students the opportunity to collaborate in solving problems and guide them in reflecting on the experience. 	
<ul style="list-style-type: none"> • Collaborate with students to establish learning rules for using digital tools and generative AI in the classroom, creating a respectful and friendly learning environment. 	
<ul style="list-style-type: none"> • Help students plan a balanced schedule that considers both physical and mental health and learning. Encourage breaks from 3C products to rest their eyes, brain, and body, establishing healthy digital learning habits. 	
<ul style="list-style-type: none"> • Integrate social–emotional learning strategies into the digital teaching process, such as recognizing one's own and others' emotions, communicating appropriately, and collaborating with peers to solve problems, thereby creating a positive and inclusive learning environment. 	

Digital Teaching



4



Applying Generative AI to Assist Teaching



Teachers and students can apply generative AI to assist in teaching and integrate it into subject learning by adopting a "collaborative" model. Teachers can use generative AI during lessons preparation, teaching, and assessment phases to enhance teaching quality and the effectiveness of higher-level learning, while students can use it to improve their self-directed learning abilities.

I — **Timing and Methods for Teachers to Apply Generative AI**

Generative AI can assist teachers in understanding subjects and pedagogical content knowledge. It can also serve as a collaborative partner to jointly design curricula, teaching activities, and learning assessments, or act as a consulting partner for classroom activities.

1 — **Lesson Preparation Phase**

- (1) Supplementing teaching content
- (2) Designing group learning tasks
- (3) Providing teaching material organization
- (4) Assisting in establishing assessment criteria

2 — **Teaching Phase**

- (1) Generating examples
- (2) Rewriting texts
- (3) Analyzing conclusions
- (4) Co-creation between teachers and students
- (5) Promoting critical thinking

3 — **Assessment Phase**

- (1) Assisting in assessment
- (2) Providing feedback for teaching

2

Timing and Methods for Students to Apply Generative AI in Learning

Students can use generative AI to draft learning plans, clarify concepts, stimulate thinking, and receive AI-driven checks and feedback to revise their writing and analyze learning outcomes. This process aids self-adjustment and improves learning effectiveness.

1 — Planning Learning Goals and Processes

By using generative AI to outline the framework and steps for learning, it provides students with starting points, relevant concepts, structures, and expected goals.

2 — Selecting Strategies

(1) Clarifying ideas

(2) Suggesting strategies

(3) Promoting thinking:

- Based on the student's learning questions and progress, generative AI continuously provides questions to the learner, functioning as a learning partner.
- Generative AI can be allowed to simulate different roles, such as having generative AI act as the student while the real student takes on the role of the teacher. Through the questioning and generation process, this promotes the student's thinking and understanding of concepts.

3 — Assessment and Feedback

(1) Revising essays

(2) Effective feedback

(3) Retrieval practice

4 — Adjusting Learning

Students adjust their learning based on assessment feedback, such as making adjustments to their English-speaking skills using the Ministry of Education's Cool English website. Additionally, based on assessment criteria and learning performance, generative AI can analyze learning outcomes and generate suggestions for adjustments, including learning goals, strategies, resources, assessment criteria, and tools. Students can then engage in self-assessment or group discussions to evaluate the feasibility of these adjustments and make any necessary changes to their learning patterns.

3

The Adaptive Learning website AI Learning Partner -e-Du

In September 2024, the Adaptive Learning website launched the "Adaptive Learning website AI Learning Partner -e-Du" for nationwide use by teachers and students. This e-Du includes two types of learning partners: a general learning partner and a subject-specific learning partner. The subject-specific learning partner integrates subject knowledge structures and diagnostic functions. Both types of learning partners are designed to work with the Four Learning Modes, providing learners with one-on-one dedicated learning partners.

The "General Learning Partner" in the "Adaptive Learning website AI Learning Partner -e-Du" guides students through Socratic Questioning to articulate their questions. It also employs dynamic assessment interactions, using hints, direct guidance, and detailed step-by-step explanations to help build learning scaffolds for the students.

The "Subject-Specific Learning Partner" in the "Adaptive Learning website AI Learning Partner -e-Du" engages in real-time online interactions with students, guiding them in self-diagnosis and subject learning to enhance their self-directed learning abilities. In addition to the Adaptive Learning website, the Cool English website offers teachers the AI Assistant and Cool English AI Teaching and Learning Tools, and provides students with practical tools for listening, speaking, writing, testing, and more. These tools allow both educators and learners to utilize a broader and more adaptive range of resources.

The screenshot displays a chat interface titled "通用型學習夥伴" (General Learning Partner). It shows a user's input: "思考中..." (Thinking...) at 17:52:31. The AI's response, at 17:52:39, explains that thermal cups work by maintaining the temperature of the liquid inside, preventing heat transfer through conduction and convection due to a vacuum layer between the inner and outer walls. The interface includes a prompt "從e度的提示進行對話及答題" (Use e-Du's hints for dialogue and answering) and a specific instruction "G-自EA2-1 透過詰問引導探究問題" (G-Independent EA2-1 Use Socratic questioning to guide inquiry). At the bottom, there are three modes: "一般模式" (General Mode), "自然探究精靈" (Natural Inquiry Spirit), and "寫作精靈" (Writing Spirit). A note at the bottom left says "切換模式會重新對話喔!" (Switching modes will restart the dialogue!).

Figure 4-1 → In 2024, the Adaptive Learning website developed the "e-Du", for education by using generative AI, offering a "General Learning Partner" to assist with suggestions, checks, and corrections for various types of questions.



Figure 4-2 → In 2024, the Adaptive Learning website developed the "e-Du", for education by using generative AI, offering a "Subject-Specific Learning Partner" to self-study questioning, practice with similar questions, and other applications.

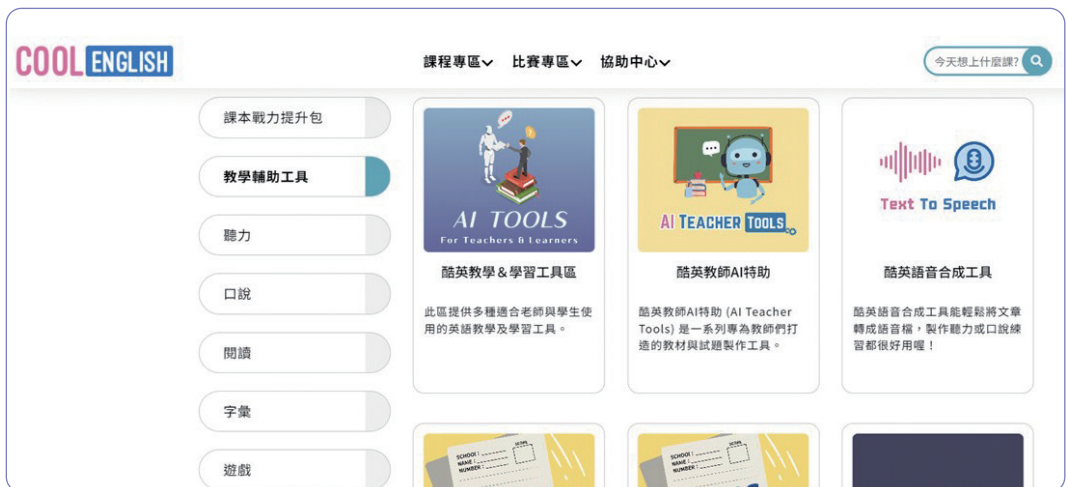


Figure 4-3 → The Ministry of Education's Cool English website offers various AI assistants for teachers to use in lesson preparation, as well as AI learning tools for speaking practice and writing corrections.

4

Risks and Challenges of Applying Generative AI in Teaching

Generative AI is having significant impacts and challenges on education. Therefore, when applying generative AI in teaching, teachers must first understand its features and limitations and also explore the associated risks in the teaching.

1 — Correctness

Is the content generated by AI absolutely correct? How can we judge it?

2 — Traceability

Does the data source of generative AI include perspectives from different countries and backgrounds?

3 — Factuality

How can we identify the truthfulness of what we see and hear?

4 — Generativity

How do we address the issues of confidential data management and privacy protection brought about by generative AI?

5 — Speculativeness

How can we enhance our ability to recognize information and think critically?

6 — Risk

How can we avoid risks when using digital tools and generative AI?

To ensure that the users of generative AI take responsibility for the content it generates, promote higher-order learning, adhere to ethical standards, and avoid biases, teachers can collaborate with students to discuss and establish guidelines for using digital tools and generative AI in the classroom. Additionally, when organizing related competitions, it is recommended that teachers:

- (1) Clearly state in the competition guidelines whether and how Artificial Intelligence or generative AI can be used.
- (2) Encourage participants to voluntarily disclose the process or steps in which AI tools were used.
- (3) Respect originality and comply with the guidelines for technology use and the Copyright Act.

5

"Human-Centered" AI Educational Application Thinking

As AI development and application become increasingly widespread, teachers should embrace a "human-centered" approach to AI educational applications, promoting human well-being and sustainable development.

1 — Protecting Basic Human Rights

AI usage should protect human life, liberty, and personal safety rights.

2 — Enriching the Meaning and Value of Existence

AI collaboration should enhance human well-being and enrich the meaning and value of life.

3 — Enhancing Convenience and Efficiency in Life

AI applications should solve human life problems, improving convenience and efficiency.

4 — Strengthening Interpersonal Connections and Collaboration

AI collaboration should promote interpersonal relationships and cooperation, strengthening social support.

5 — Addressing Social Problems and Conflicts

AI should play a positive role in analyzing and resolving social problems and conflicts, thereby promoting the common good in society.

6

Digital Teaching Examples

With the rapid development and application of Generative AI, this guide allows teachers to reference these examples for practical applications and includes multiple teaching examples to help teachers effectively integrate this advanced technology into classroom teaching. These examples are designed to enhance the interactivity and engagement of teaching while strengthening students' digital literacy, ensuring they have the necessary skills to navigate the future digital society.

This guide includes a total of 35 teaching examples, covering various educational stages, from elementary to junior high and senior high school. Subjects include Mandarin Chinese Language, Mathematics, Natural Sciences, Social Studies, Arts, and Technology. Each teaching example provides a detailed explanation of how to apply digital tools and generative AI to assist teaching, along with specific operational steps and precautions. These examples are intended to help teachers flexibly utilize this technology in the classroom, thereby improving teaching effectiveness and enriching students' learning experiences.



Artificial
Intelligence





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