Guidelines for Collaboration, Co-learning, and Cultivation of Artificial Intelligence Competencies in University Education[1]

NTHU AI Task Force

National Tsing Hua University

Considering the substantial impact generative artificial intelligence (AI) has on higher education learning environments, we recommend that our institution's faculty and students adopt a transparent and responsible approach when employing AI products, including generative AI, within educational settings:

- Transparency: Instructors should establish explicit guidelines for AI utilization in their courses, with both students and teachers candidly disclosing their AI usage when relevant.
- Responsibility: Instructors and students should recognize AI as one among various content sources and possess the ability to evaluate the accuracy of AI-generated content, assuming responsibility for their produced content.

We suggest that the role of AI in teaching and learning should encompass collaboration and co-learning:

1. **Working with AI**: Leverage AI tools to collaborate and optimize the benefits of diverse knowledge domains, achieving efficient, innovative, and human welfare-enhancing outcomes.
2. **Learning with AI**: View AI as a tool for intellectual discovery, supporting the integration and adaptation of various knowledge domains through reflection on learning and thinking processes, enabling the construction of new knowledge forms.

● Students and educators should thoroughly understand the following challenges when using AI:

Challenge 1: Technical Barriers: Be aware that language models' complex inner workings hinder the development of open-source, transparent, and democratic models.

Challenge 2: Credibility: Identify that scarce training data requires validation of generated content's credibility and accuracy.

Challenge 3: Bias and Fairness: Prevent usage of content generated from biased training texts or content that jeopardizes academic integrity.

Challenge 4: Pedagogical Methods: Reevaluate teaching and assessment approaches, along with potential outcomes.

Challenge 5: Academic Ethics: Examine issues pertaining to authorship and plagiarism.

● Integrating AI in Teaching and Learning:

1. Teaching Material Preparation:
   - ☑ AI can support summarization of video subtitles or presentation content for class notes or review.
   - ☑ AI can streamline the creation of presentation materials, such as generating images.
   - ☑ AI can suggest lesson plans (course outlines) and provide diverse, relevant examples as supplementary explanations.

2. Student Learning:
   - ☑ AI can facilitate interdisciplinary learning.
   - ☑ AI can assist in brainstorming, document refinement, and foreign language editing.
   - ☑ AI can efficiently consolidate key points from literature for focused comprehension and application.
   - ☑ Though generating in-depth reports with AI may be challenging, AI can provide frameworks for students to supplement with their knowledge or perspectives.
   - ☑ AI can serve as a personalized tutor, accommodating individual learning progress and potentially alleviating resource constraints.
   - ☑ Explore "prompt engineering" to leverage AI's integration and retrieval capabilities for innovative idea generation.

3. Educator Teaching:
   - ☑ The institution respects educators' AI tool usage strategies in courses; educators should clarify rules for student AI use in course syllabi, especially regarding proper citation and disclosure.
   - ☑ Guide students in knowledge provenance, discourage reliance solely on AI-generated content, and address academic and research ethics issues associated with AI tool usage.
   - ☑ Emphasize relevant domains' fundamental concepts, promoting deeper learning through extension, association, and application, rather than rote memorization.
   - ☑ Investigate AI's potential impact on arts, humanities, and social science disciplines; educators can facilitate group discussions and guide students in delivering oral presentations on AI utilization for creation or proposing alternative perspectives.

4. Learning Assessment (Assignments/Reports):
   - ☑ Depending on the course, allow AI assistance for answering questions, but require students to submit assignments in diverse formats, emphasizing domain knowledge construction and knowledge internalization over score attainment.
   - ☑ Utilize AI-generated answers as examples, guiding students in critique and revision, annotating edited sentences or paragraphs, and providing justifications.
   - ☑ Develop students' ability to trace knowledge origins, assessing sources, accuracy, and school of thought perspectives.
   - ☑ Focus grading on students' abilities targeted by the course.

5. Learning Assessment (Exams):
  - ☑ Design questions requiring deeper reasoning, creativity, analysis (e.g., contextual judgment, pro-con arguments, contentious issues), and critical thinking, emphasizing knowledge's role in problem contexts rather than merely searchable knowledge.
  - ☑ Consider AI-human collaboration assessments, permitting AI usage in exams while evaluating students' critical thinking and creativity.
  - ☑ For take-home exams, pre-test questions with AI; unsuitable questions may include those on which AI performs well.

● Cultivating AI Competence

1. What is AI Competence?

   AI competence encompasses more than mere programming capabilities; it entails possessing a fundamental comprehension of AI technology and its applications, along with the skills to assess, employ, and execute AI and associated applications. This competence requires the judicious utilization of AI in human learning, work, and life, contemplation of its effects on human existence, and the ultimate promotion of human welfare.

   Foundational:
   (1) Understand the basic concepts, techniques, methods, and instrumental nature of AI.
   (2) Recognize AI application scenarios and potential impacts, and understand the capabilities and limitations of AI tools.
   (3) Recognize ethical, privacy, and security issues potentially caused by AI and cultivate thinking and judgment abilities.

   Advanced:
   (4) Accurately disclose the AI usage process to ensure transparency.
   (5) Apply various types of AI in work and life situations, improving the ability to solve complex problems.
   (6) Continuously reflect on the relationship between AI and humans to enhance human welfare.

2. Cultivating AI Competence in Students: Integrating Formal (Courses, Research) and Informal Learning (Clubs, Activities, Competitions, Internships)
   (1) Offer foundational and specialized AI courses: Provide (micro) courses to guide students in understanding the basic knowledge, evolution, and risks of AI technologies, helping them comprehend AI's capabilities and limitations, and discern its accuracy; offer specialized AI courses covering topics such as machine learning, natural language processing, robotics, and computer vision to facilitate continuous technical refinement.

(2) Incorporate AI into curricula: Embed AI components within courses across disciplines like engineering, business management, education, arts, and humanities, fostering the development of critical thinking, problem-solving, and innovative collaboration skills. Simultaneously, emphasize the importance of considering social and environmental ramifications in decision-making processes.

(3) Establish academic integrity and accountability mechanisms: Formulate regulations for AI research and applications to ensure compliance with academic ethics and legal requirements.

(4) Provide experiential learning opportunities: Offer students opportunities to participate in AI research projects, construct AI models, and develop AI applications, as well as practical coursework to tackle real-world societal issues.

(5) Forge partnerships with industry collaborators: Enable students to acquire hands-on exposure to real-world AI applications through internships or industry-academic partnerships, thereby understanding the practical implications of technological advancements.

(6) Organize workshops, seminars, or forums to explore AI's impact on various aspects: Provide students with opportunities to learn from experts in different fields about AI's effects on technology, life, society, academia, and ethics, participate in discussions, and create platforms for peer knowledge sharing.

(7) Advocate interdisciplinary collaboration: AI development necessitates the proactive participation of interdisciplinary talents; universities can promote interdisciplinary learning by designing and innovating courses or institutional systems. Additionally, hosting competitions, special projects, or self-study groups can facilitate interdisciplinary and cross-cultural collaboration among students.

Contributors of Task Force (listed by last name):

Prof. Jason S. Chang

Ms. Nai-Fang Chang

Prof. Yi-Shin Chen

Prof. Su-Chu Hsu

Dr. Tonny Menglun Kuo

Prof. Po-Chih Kuo

Prof. Fu-Ren Lin

Prof. Wen-Yuan Lin

Prof. Chung-Chuan Lo

Prof. Kuo-Liang Ou

Dr. Hsinyi Peng

Prof. Chuan-Kang Ting

Prof. Ying-Chun Tsai

Prof. Daw-Wei Wang

Mr. Zhi-Kai Wang

Prof. Shun-Chi Wu

Prof. Yung-Hsien Wu