



A Generative AI-Driven Teacher-Student Co-Creation Instructional Design for Practice Courses in Aging Services

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Abstract. China has entered a moderately aging society, with a shortage of professional aging service talents becoming the biggest bottleneck constraining industry development. Traditional practice courses overemphasize theory and remain disconnected from job market demands, failing to cultivate students' composite competencies such as needs assessment, program design, and ethical decision-making. The rapid development of generative artificial intelligence offers new possibilities for pedagogical innovation, yet current applications largely remain at the instrumental level without truly addressing core teaching structures. Based on the “Teacher-Student-AI” triadic synergy theoretical framework, this paper proposes a conceptual instructional design for a generative AI-driven teacher-student co-creation model in aging services practice courses. The design positions AI as an idea catalyst, a cognitive collaborator, and a process supporter. Through three core mechanisms—motivation activation, cognitive synergy, and relationship reconstruction—it constructs a full-process teaching design spanning pre-class, in-class, and post-class stages, integrated with a project titled “Community-Based Social Support Program Design for Elderly Individuals Living Alone.” The design also includes a four-dimensional evaluation framework covering process, outcomes, reflection, and attitudes. This conceptual design aims to provide a referable blueprint for cultivating core competencies in aging service talents and to offer theoretical guidance for pedagogical innovation in practice courses.

Keywords: aging society; aging services education; generative AI; teacher-student co-creation.

1 Introduction

China has entered a moderately aging society. By end of 2025, the population aged 60+ exceeded 330 million (>23%), including ~45 million disabled/semi-disabled elderly. In five years, the elderly population will reach 400 million, with a caregiver shortage of 5.5 million — professional care demand is surging.

Talent shortage is the biggest bottleneck. New professions — nursing home caregivers, geriatric social workers, rehabilitation therapists — all face severe shortages. Aging services are cross-disciplinary and practice-oriented, requiring composite skills, yet curricula remain theory-heavy and disconnected, with weak industry-education integration. Pedagogical reform is urgent.

Generative AI offers new possibilities, but current applications remain instrumental, not touching core teaching structures. The traditional “teacher-directed, student-receptive” model fails to cultivate critical thinking and human-machine collaboration.

“Teacher-student co-creation” emphasizes equal collaboration and knowledge generation, aligning with AI’s generative nature. Positioning AI as a “third agent” can foster a new human-machine collaborative teaching model.

This paper proposes a conceptual “Teacher-Student-AI” co-creation instructional design for aging services courses, outlining its rationale, process, and expected outcomes. It is a theory-driven design without empirical validation; all effect statements are design expectations.

2 Literature Review

2.1 Research on Professional Aging Service Talent Cultivation

Aging services are cross-disciplinary and practice-oriented, requiring composite competencies [1]. Yet talent supply is severely insufficient [2-3]. Current cultivation faces curriculum-job disconnection, weak practical teaching, and limited industry-education integration. The training pathway is fragmented [4-5]. Beyond basic care, talents need needs assessment, program design, and ethical decision-making [1], yet practitioner quality is low and senior managers are scarce [3]. Most studies focus on macro-policy rather than curriculum teaching, providing an entry point for this study.

2.2 Research on Generative AI Applications in Professional Practice Teaching

International research highlights AI’s educational potential. Keiper shows generative AI supports experiential learning [6]. focus on personalized paths [7]. find AI enhances self-efficacy [8]. Early domestic research focused on AI-Assisted Instruction, which relied on preset rules and lacked flexibility [9]. demonstrate that intelligent agents boost motivation and cognition [10]; emphasizes generative AI’s creativity and interactivity [11]. Most studies concentrate on general contexts, lacking theory-based designs for practice-oriented professions — a theoretical gap.

2.3 Research on Teacher-Student Co-Creation Teaching Models

Co-creation has evolved through three stages: teacher-dominated, teacher-student interaction, and human-machine co-creation. Early work focused on AI's empowerment in single segments [12]. Since 2024, research has shifted to overall model reconstruction. [13] proposed a bidirectional empowerment mechanism [13]. [14] found information quality affects co-creation outcomes [14]. However, none have focused on specific professional fields like aging services.

2.4 Literature Review Summary

Limitations remain: unbalanced research fields — aging studies focus on macro-policy, AI and co-creation studies on general contexts; unsystematic content — cultivation studies do not explore AI-based innovation, AI applications rarely integrate with practice course characteristics; empirical orientation lacking design; and insufficient cross-fertilization among the three fields. How to construct a “Teacher-Student-AI” co-creation model remains a gap. This paper focuses on conceptual design based on the triadic synergy framework, creating a full-process co-creation teaching model.

3 Theoretical Framework: "Teacher-Student-AI" Triadic Synergy Model for Aging Services

3.1 Theoretical Foundation

This framework is constructed based on constructivism and distributed cognition theory. Constructivism holds that knowledge is not passively received but actively constructed through learners' interaction with their environment [14]; distributed cognition theory emphasizes that cognitive activities exist not only within individual minds but are distributed across interactive systems involving individuals, tools, and environments. Introducing generative AI into the teaching process precisely incorporates AI as a "cognitive partner" into learners' cognitive systems, forming a human-machine collaborative distributed cognitive network.

In aging services education, this theoretical perspective is particularly important. Aging services-related courses require students to possess problem-solving abilities in complex situations—abilities difficult to obtain through one-way knowledge transmission and requiring gradual construction through continuous interaction with real problems and diverse perspectives. AI, as a cognitive tool capable of generating diverse viewpoints and simulating complex situations, is expected to play a unique role in this construction process.

3.2 AI's Triple Roles

In the “Teacher-Student-AI” co-creation model, AI assumes three roles:

Idea Catalyst — utilizing generative capabilities to provide diverse perspectives and solutions, expanding thinking boundaries, such as generating multidimensional interview frameworks or multiple program directions.

Cognitive Collaborator — providing real-time support during thinking processes, including information retrieval, logical structuring, feasibility assessment, and ethical risk identification.

Process Supporter — supporting the entire learning process from pre-class to post-class, including generating preview materials, recording discussion points, providing assignment feedback, and accumulating case resources.

These three roles dynamically transform and collaboratively function according to teaching needs.

3.3 Core Mechanisms

The construction logic of this framework is as follows: Based on the dilemmas in aging service talent cultivation, we identified three core needs—stimulating motivation, promoting human-machine cognitive synergy, and reshaping power relationships. Drawing on constructivism and distributed cognition theory, we incorporated AI as a “cognitive partner” into the teaching system. Considering generative AI’s technical characteristics (content generation, conversational interaction, process documentation), we defined AI’s triple roles. Finally, we derived three core mechanisms:

Motivation Activation Mechanism — uses generative AI to create “cognitive conflict” and “authentic challenges,” transforming external learning requirements into internal inquiry motivation. In aging services courses, students instruct AI to generate dilemma cases (e.g., a caregiver refusing help); the case’s complexity stimulates inquiry interest and activates learning motivation.

Cognitive Synergy Mechanism — defines clear human-machine division: AI handles foundational tasks such as information processing and preliminary solution generation; teachers and students serve as “direction-setters and value-judges,” focusing on raising genuine questions, setting evaluation criteria, critically examining AI outputs, and creatively integrating them. Through the “AI generation — teacher-student critical examination — feedback optimization” cycle, complementary human-machine thinking is achieved.

Relationship Reconstruction Mechanism — by introducing AI as a “common operational object” and “dialogue partner,” transforms the teacher’s role from “authoritative lecturer” to “collaborative designer and thinking coach,” and the student’s role from “passive recipient” to “active constructor and responsible value co-creator,” building an equal learning community. Students take responsibility for AI-generated content, deciding what to accept, reject, or modify based on professional judgment.

The three mechanisms are interwoven and cyclically reinforcing. Motivation activation provides sustained impetus for cognitive synergy; cognitive synergy triggers new problems that further stimulate exploration; relationship reconstruction runs through the entire process, ultimately forming a stable new learning community.

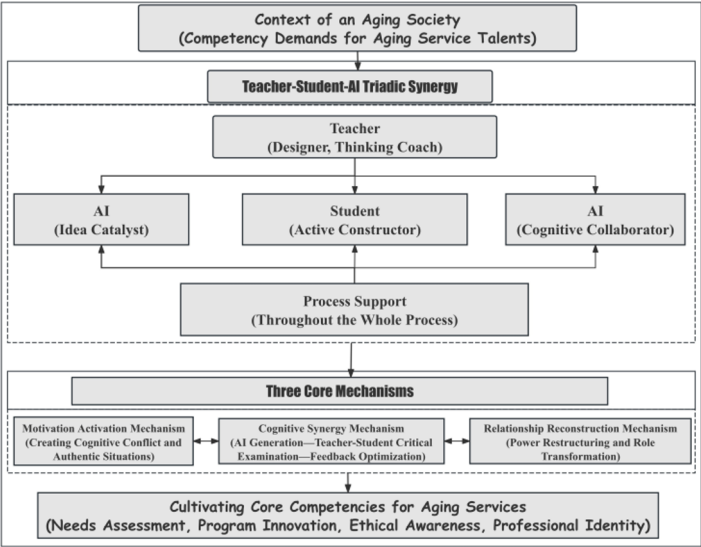


Fig. 1. "Teacher-Student-AI" Triadic Synergy Model for Aging Services.

4 Course Design: A Case Study of Aging Services-Related Courses

4.1 Basic Course Information

This paper selects a representative aging services practice course as the design vehicle. This core course for social work majors runs 16 weeks (32 class hours), aiming to cultivate students' understanding of aging characteristics, comprehensive needs assessment, service program design, cultural competence, and ethical application. It combines theoretical instruction with practical activities including case analysis, role-playing, community projects, and practice simulations.

The following sections present the course design and the correspondence between each segment and the three mechanisms and AI roles.

4.2 Full-Process Teaching Design

Based on the triadic synergy framework, this design redesigns the pre-class, in-class, and post-class stages, as shown in Table 1.

Table 1. Full-Process Teaching Design Based on the Triadic Synergy Theoretical Framework

Teaching Stage	Dominant Mechanism	AI Role	Core Teaching Activities	Design Intent
Pre-class	Motivation Activation	Idea Catalyst	Jointly determine learning objectives; instruct AI to generate pre-view materials; propose discussion questions	Stimulate inquiry, transform external requirements into intrinsic motivation.
In-class	Cognitive Synergy	Idea Catalyst& Cognitive Collaborator	Call on AI for information and plan generation; analyze AI-generated arguments; guide students to use AI critically	Achieve the "AI generation—critical examination—feedback optimization" cycle.
Post-class	Relationship Reconstruction	Cognitive Collaborator& Process Supporter	AI provides initial feedback; write modification explanations and refine work; provide guidance; archive results	Promote students from passive recipients to active constructors.

Pre-class stage centers on motivation activation. After co-setting objectives, students instruct AI to generate background, controversial viewpoints, and cases, then propose discussion questions. AI as idea catalyst creates cognitive conflict and helps establish initial frameworks.

In-class stage centers on cognitive synergy. Teachers organize group and whole-class discussions; students call AI for information, plan generation, or obstacle prediction. AI as cognitive collaborator supports thinking; teachers guide critical use, emphasizing teachers and students as “direction-setters and value-judges.” AI may generate different stances for debate, reinforcing the cycle.

Post-class stage centers on relationship reconstruction. After initial drafts, AI provides preliminary feedback; students revise and write “modification explanations” justifying their acceptance or rejection of AI suggestions. Teachers then provide in-depth guidance, with AI as process supporter enabling iterative optimization..

4.3 Practice Project Design

A six-week “Community-Based Social Support Program Design for Elderly Individuals Living Alone” project runs from weeks 6 to 11. Students work in groups to design comprehensive support plans, presenting in week 12 with community representatives as judges. The four stages correspond to mechanisms and AI roles (Table 2).

Table 2. Practice Project Design Based on the Triadic Synergy Theoretical Framework

Practice Stage	Dominant Mechanism	AI Role	Student Tasks	Design Intent
Needs Assessment	Motivation Activation	Idea Catalyst& Cognitive Collaborator	Design interview outlines; conduct interviews; AI organizes needs data	Spark inquiry; cultivate needs assessment
Program Conception	Cognitive Synergy	Idea Catalyst& Cognitive Collaborator	Generate program directions; analyze and compare; AI refines programs	Cultivate innovation and design via "AI generation—critical examination".
Program Optimization	Cognitive Synergy & Relationship Reconstruction	Cognitive Collaborator & "Ethical Mirror"	Assess feasibility; AI prompts risks; make judgments and revise	Build critical thinking and ethical decision-making; strengthen agency.
Outcome Presentation	Relationship Reconstruction	Process Supporter & Cognitive Collaborator	Write program; AI polishes and simulates defense; present to community	Strengthen professional identity; complete transition to practitioner.

Needs assessment stimulates inquiry into real problems. Students instruct AI to generate interview frameworks; AI helps organize and analyze needs data, activating professional mission.

Program conception centers on cognitive synergy. Students instruct AI to generate multiple directions; groups analyze strengths, weaknesses, risks, and applicability; after selecting a direction, AI assists refinement in the “generation—critical examination” cycle.

Program optimization integrates cognitive synergy and relationship reconstruction. AI assists feasibility reporting and, as “ethical mirror,” prompts ethical risks; students respond and revise independently, embodying “responsible value co-creators.”

Outcome presentation centers on relationship reconstruction. AI polishes language and simulates defense; students present to community representatives, receiving authentic feedback that strengthens professional identity.

4.4 Evaluation Framework Design

A multidimensional evaluation framework based on the three mechanisms spans the full process with four dimensions (Table 3).

Table 3. Evaluation Framework for the "Teacher-Student-AI" Co-Creation Teaching Model

Evaluation Dimension	Dominant Mechanism	Evaluation Content	Evaluation Method	Corresponding Stage
Process Evaluation	Motivation Activation & Cognitive Synergy	Preview quality; class participation; group contribution; AI interaction	Teacher observation; peer assessment; AI log analysis	Pre-class, in-class
Outcome Evaluation	Cognitive Synergy & Relationship Reconstruction	Needs analysis; program feasibility; ethical considerations; presentation	Program rubric; expert review; presentation scoring	Post-class (after project completion)
Reflective Evaluation	Relationship Reconstruction	AI suggestion acceptance/rejection; critical thinking; judgment formation	Modification explanation; reflective journal analysis	Post-class (throughout the process)
Attitudinal Evaluation	Motivation Activation & Relationship Reconstruction	Understanding of aging services; confidence; willingness	Pre/post questionnaires; semi-structured interviews	Before/after course

Process evaluation examines motivation activation and cognitive synergy through preview quality, participation, collaboration, and AI interaction, via observation, peer assessment, and AI logs.

Outcome evaluation examines cognitive synergy and relationship reconstruction's effects. Core objects are the program document and presentation, covering needs analysis comprehensiveness, program innovativeness and feasibility, ethical thoroughness, and presentation professionalism.

Reflective evaluation examines metacognition and critical thinking through "modification explanations" and reflective journals. Students justify their acceptance or rejection of AI suggestions; teachers analyze texts to assess independent judgment.

Attitudinal evaluation measures changes in students' understanding, confidence, and willingness regarding aging services, comparing pre/post questionnaires and interviews.

The framework features full-process coverage; multidimensional complementarity (process + outcomes, quantitative + qualitative); close correspondence with the theoretical model; and strong operability for frontline teachers.

5 Conclusion and Outlook

This paper proposes a conceptual design for a “Teacher-Student-AI” co-creation teaching model to address the urgent demand for aging service talents. Based on the triadic synergy framework, the design positions AI as an idea catalyst, cognitive collaborator, and process supporter. Through three mechanisms—motivation activation, cognitive synergy, and relationship reconstruction—it constructs a full-process teaching plan spanning pre-class, in-class, and post-class stages, along with a four-dimensional evaluation framework.

As a conceptual study without empirical validation, this paper applies the triadic synergy model to aging services education for the first time, clarifying AI's triple roles. The design does not rely on specialized platforms and is transferable. Future work includes pilot implementation to test effectiveness and developing supporting tools to lower application barriers.

This paper offers a theory-driven pathway for cultivating aging service professionals with competence and ethical awareness, and it is hoped that the design will be tested and refined in future practice.

References

1. Xiao, L.F.: Paths and Countermeasures for Cultivating Aging Service Talents under the Background of Population Aging. *Journal of Xiamen City Vocational College* (4), 5–8 (2022).
2. Ma, D.N.: Urgent Need to Address the Talent Shortage in the Aging Service Industry. *Scientific Research on Aging* 6(2), 36–45 (2018).
3. Zang, S.M.: Research on the Construction of Aging Service and Management Talent Teams. *Scientific Research on Aging* 6(1), 46–54 (2018).
4. Yu, T., and Huang, J.C.: Construction of China's Aging Service Talent Cultivation Mechanism. *Scientific Research on Aging* 6(9), 37–45 (2018).
5. Wang, T.X., and Han, J.J.: Current Situation, Problems, and Countermeasures of China's Elderly Care Service Talent Cultivation. *Taxation and Economy* (6), 52–57 (2018).
6. Keiper, M.C.: ChatGPT in Practice: Increasing Event Planning Efficiency through Artificial Intelligence. *Journal of Hospitality, Leisure, Sport & Tourism Education* 33 (2023).
7. Parker, L., Carter, C., Karakas, A., et al.: Graduate Instructors Navigating the AI Frontier: The Role of ChatGPT in Higher Education. *Computers and Education Open* 6 (2024).

8. Urban, M., Děchtěrenko, F., Lukavský, J., et al.: ChatGPT Improves Creative Problem-Solving Performance in University Students: An Experimental Study. *Computers & Education* 215 (2024).
9. Kong, S., and Zhu, D.Y.: The Dilemma and Attribution of Human-Machine Collaborative Teaching: A Case Study of the Robot Teacher “Hua Jun”. *e-Education Research* 45(8), 58–63+70 (2024).
10. Huang, C.Q., Zhong, Y.H., Wang, X.Z., et al.: From Single-Agent to Multi-Agent: Design and Empirical Study of Motivation-Based Learning Activities Supported by Large Language Model Agents. *Journal of East China Normal University (Educational Sciences)* 43(5), 44–56 (2025).
11. Wang, F.: Teacher Development in the Context of General Artificial Intelligence: Crisis and Opportunity Coexist. *Educator* (19), 40–43 (2023).
12. Zhang, L.: Theoretical Exploration of Adaptive Writing Feedback and Task Learning Systems Based on Generative AI. *Contemporary Foreign Language Studies* (5), 132–142 (2025).
13. Liu, Q.L., and Wang, P.S.: Research on the Collaborative Model of Generative AI and Domain Experts for Scientific and Technological Intelligence Analysis. *Journal of Intelligence* [J/OL]. <https://link.cnki.net/urlid/61.1167.G3.20251017.1459.008> (2025).
14. Qiu, J.P., Ma, C.H., and Xu, Z.Y.: Research on Influencing Factors and Mechanisms of Initial Usage Behavior of Generative Artificial Intelligence among University Users. *Information Science* 43(9), 1–11 (2025).

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