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A Holistic Education Framework Integrating AI, Technical Knowledge and Ethics for Dynamic Leadership in Mandarin Language Teaching

Sheyra Silvia Siregar[1], Ria Riski Marsuki[2]
[1] Universitas Negeri Semarang, Semarang, 50229, Indonesia
[2] Pendidikan Bahasa Mandarin, Fakultas Bahasa dan Seni, Universitas Negeri Semarang, 50229, Indonesia
correspondent author: sheyra89@mail.unnes.ac.id

Abstract

This community service initiative aimed to strengthen instructional leadership among Mandarin language teachers in addressing the challenges of the Artificial Intelligence (AI) era. Guided by a holistic education framework integrating technical knowledge, social wisdom, and ethical values, the program focused on enhancing teachers' digital literacy, pedagogical innovation and ethical awareness in technology-assisted instruction. Implemented through a participatory approach, the activities included four key stages: needs assessment, training, mentoring and evaluation. Teachers actively collaborated to identify learning challenges and design AI-based teaching practices grounded in cultural and moral responsibility. The results revealed substantial improvement in teachers' ability to develop creative, AI-supported Mandarin learning materials and to apply digital tools with cultural sensitivity. Participants also reported higher confidence and leadership capacity in managing AI-integrated classrooms. Furthermore, the initiative successfully established a sustainable professional learning network that fosters collaboration and continuous professional growth among educators. Overall, this program contributed significantly to improving teacher competence, promoting ethical and innovative pedagogy and preparing Mandarin language educators to become adaptive, responsible and culturally aware leaders in the age of artificial intelligence.

Keywords: Instructional Leadership, Mandarin Language, AI, Holistic Education

1. Introduction

Artificial Intelligence (AI) and holistic education are two transformative paradigms shaping the landscape of 21st-century learning [1]–[3]. AI provides innovative tools to enhance the quality, efficiency, and personalization of education, while holistic education ensures that this technological advancement remains balanced with cognitive, emotional, social, and ethical development. The integration of AI into holistic education offers an opportunity to create learner-centered experiences that promote creativity, empathy and cultural awareness alongside academic achievement[4],[5]. In the context of Mandarin language learning, this integration is particularly significant because the language functions not only as a means of communication but also as a gateway to understanding Chinese culture and global interconnectedness. Thus, Mandarin teachers are expected to develop instructional approaches that combine linguistic competence with character formation and intercultural sensitivity[6]-[8].

The rapid emergence of AI technologies presents both opportunities and challenges in education. On one hand, AI-based applications—such as intelligent tutoring systems, adaptive learning software and automated feedback tools—can improve teaching efficiency and personalize learning experiences[9]-[11]. On the other hand, concerns about ethical implications, such as data privacy, algorithmic bias, and the potential reduction of human interaction, call for a balanced and reflective use of technology. Holistic education offers a framework to address these concerns by positioning AI as a supportive tool for human-centered teaching rather than a replacement for educators. When integrated responsibly, AI can foster dynamic learning environments that cultivate students' intellectual, emotional and moral dimensions[12]-[15]. Therefore,

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teachers must be equipped not only with technical skills but also with ethical and cultural competencies to guide students in navigating the complexities of digital learning.

At Yayasan Nusa Putera School in Semarang, Mandarin language education is an essential component of the curriculum designed to develop students' global competence. However, classroom observations indicate that most teachers still rely on traditional, teacher-centered approaches emphasizing rote memorization rather than interactive engagement. Although schools are equipped with adequate technological facilities such as computers, projectors, and internet access, the integration of AI-based tools in teaching remains minimal[16]. Interviews with the team leader during the visit revealed several key obstacles faced by Mandarin teachers at the Nusa Putera National School Foundation in Semarang, namely: (1) teachers still adhere to traditional learning systems when teaching; (2) the use of technology, including AI-based applications, is limited due to insufficient technical training; (3) there is a need for training on holistic education systems that help teachers integrate language, culture, ethics, and critical thinking; (4) limited access to modern teaching aids such as interactive software and multimedia materials; (5) a lack of Mandarin reading materials to support students' literacy in the foreign language; and (6) a growing demand for higher quality education that emphasizes character building in addition to academic mastery. These challenges highlight the necessity of empowering teachers to implement innovative, technology-based, and ethically grounded instructional models.

In response to these needs, this community service initiative was designed to strengthen instructional leadership among Mandarin language teachers through a holistic education framework that integrates AI, technical knowledge and ethics. The program aimed to enhance teachers' digital literacy, pedagogical innovation and ethical awareness to create a more adaptive and student-centered[18]. Mandarin learning environment. Implemented through a participatory approach, the initiative consisted of four stages: needs assessment, training, mentoring and evaluation[17]. Teachers were actively engaged as collaborators in identifying instructional challenges and designing AI-assisted, culturally grounded teaching practices. By fostering reflective dialogue and hands-on mentoring, the program promoted not only technological competence but also the development of professional learning communities. Ultimately, this initiative contributed to the formation of dynamic instructional leaders who are capable of integrating AI ethically and effectively in Mandarin language education, while nurturing the values of creativity, responsibility and intercultural understanding in the digital era.

2. Activity Methods

The methodology of this community service program was designed to systematically enhance Mandarin teachers' instructional leadership through AI integration and holistic education principles. It combined participatory training, mentoring, and evaluation to ensure practical application and measurable improvement in teaching competencies.

2.1 Time and Place

The community service activity was conducted on August 11–12, 2025 at Yayasan Nusa Putera School, Semarang, Indonesia. The school was selected as the implementation site because it represents a multilingual educational environment where Mandarin language plays a strategic role in character and global competence development.

2.2 Participants

A total of 30 Mandarin language teachers participated in the program. They represented various educational levels—primary, junior high, senior high, and vocational school—under Yayasan Nusa Putera. All participants were actively involved in every phase of the activity, from needs analysis to evaluation, ensuring collaborative engagement throughout the process.

2.3 Approach

The program applied an educational and participatory approach. It aimed not only to transfer knowledge but also to empower teachers as agents of change capable of integrating AI technology with the principles of holistic education. The approach emphasized reflective learning, collaboration, and hands-on experience through workshops and mentoring sessions.

2.4 Implementation Procedures

The activity was designed through four key stages as outlined below:

Table 1. AI-Based Mandarin Teaching Program: Design, Participants, Procedure, and Evaluation

Program Design	Participants	Procedure	Evaluation Design
1) Transform traditional teaching practices into more interactive and student-centered.	30 Mandarin language teachers from Yayasan Nusa Putera School, Semarang, Indonesia, representing primary and secondary levels, actively participated in all activities.	Needs analysis to identify gaps	Effectiveness assessed using **pre-test and post-test** to measure participants' understanding and application of AI in Mandarin teaching.
Provide technical training for teachers to utilize AI-based applications	30 Mandarin language teachers from Yayasan Nusa Putera School, Semarang, Indonesia, representing	Training on AI applications, lesson design and interactive tools	Participant evaluations collected on material, instructors, methods, and benefits.

effectively.	primary and secondary levels, actively participated in all activities.		
Conduct holistic education training that integrates language skills, culture, ethics, and critical thinking.	30 Mandarin language teachers from Yayasan Nusa Putera School, Semarang, Indonesia, representing primary and secondary levels, actively participated in all activities.	Collaborative development of AI-based learning modules	Results showed significant improvement and high relevance ratings.
Improve access to modern teaching aids, including interactive software and multimedia materials.	30 Mandarin language teachers from Yayasan Nusa Putera School, Semarang, Indonesia, representing primary and secondary levels, actively participated in all activities.	Mentoring and feedback sessions for classroom implementation	Result according to pre and posttest confirmed the relevance and applicability of the training.

3. Results and Discussions (10 PT)

This section presents the outcomes of the Community Service Program, focusing on the development of dynamic instructional leadership among Mandarin language teachers through AI integration and holistic education. The discussion highlights the program's impact on teachers' technical, pedagogical, and ethical competencies, as well as the changes observed in their professional behavior. The following is the documentation of the opening session:

Figure 1. Opening ceremony by the Team Leader and Partner

3.1 First Session of Materials

The Community Service Program entitled *"Building Dynamic Instructional Leadership to Improve the Quality of Mandarin Language Teaching in the Era of New Generation AI Development through a Holistic Education Model Integrated with Technical Knowledge, Social Wisdom, and Ethics"* was conducted on **August 11–12, 2025** at Yayasan Pendidikan Nasional Nusaputera, Semarang. A total of **30 Mandarin language teachers** from Kindergarten, Elementary, Junior High and Senior High School levels participated. The sessions were delivered by Sheyra Silvia Siregar, S.S., MTCSOL and Sheyla Silvia Siregar, S.S., M.Si., supported by the program implementation team. The activity included workshops, interactive discussions, and hands-on exercises aimed at integrating AI-based tools and holistic education principles into Mandarin language instruction. The discussion focused on three main aspects:

1. Using AI as a teaching aid to support planning, instruction, and evaluation.
2. Applying teaching methods that integrate soft skills, including communication, cross-cultural understanding, and digital ethics, to meet the challenges of AI-era Mandarin instruction.
3. Implementing Dynamic Instructional Leadership principles to empower teachers in designing adaptive, interactive, and student-centered lessons, combining technical knowledge, social wisdom, and ethical values.

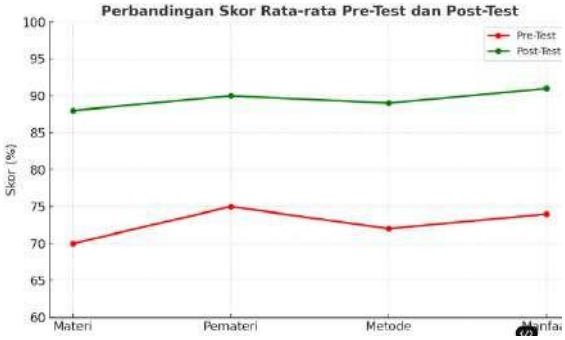
Figure 2. Documentation of the first material session delivered by the speakers.

With this approach, the teachers participating in the workshop gained skills not only in the technical aspects of Mandarin language instruction but also in the ethical and wise utilization of AI technology, aimed at improving the quality of learning across different educational levels.

Figure 3. Documentation of the activities conducted by the second speaker.

3.2 Results of Activity Evaluation

The evaluation was conducted in two stages: (1) a questionnaire assessing participants' perceptions of program implementation, and (2) a pre-test and post-test to measure knowledge and skills gained during the training. Before the program, most participants had limited understanding of using Artificial Intelligence (AI) in Mandarin language teaching. After attending the material sessions, practical exercises, and interactive discussions, the post-test scores showed consistent improvement across all indicators, including mastery of content, application of AI-based teaching methods and understanding of Dynamic Instructional Leadership principles. This demonstrates that the training successfully enhanced teachers' technical and pedagogical skills while fostering readiness to integrate AI into their classrooms. These results provide quantitative evidence of the program's positive impact on participants' competencies. **Figure 1** illustrates the average pre-test and post-test scores of the 30 participants, highlighting measurable improvement in knowledge and practical application of AI-integrated teaching strategies. Below are the average pre-test and post-test scores of the participants:



Graph 1. Participants' Average Pre-test and Post-test Scores

3.3. Follow-up Recommendations

The training on the utilization of Artificial Inteligence (AI) Intelligence (AI) in Mandarin language teaching at Yayasan Nusaputera was carried out smoothly and achieved the expected objectives. The evaluation results showed a significant improvement in participants' understanding, skills, and motivation in integrating AI technology into their teaching practices. This activity not only enriched teaching methods but also encouraged technology-based innovation within the school environment. The following are follow-up actions that can be implemented as long-term solutions:

a. Continuous Mentoring: Organizing follow-up sessions or online clinics to assist teachers in applying AI in the classroom.

b. Digital Module Development: Creating AI-based teaching modules that can be used and adapted by teachers.

c. Program Replication: Encouraging the implementation of similar training programs in other schools under Yayasan Nusaputera or educational partners.

d. Periodic Monitoring and Evaluation: Conducting evaluations of AI usage in classrooms every 3 to 6 months to measure effectiveness and provide recommendation for improvement.

3.4 Reflection and Theoretical Implications

The observed improvements align with instructional leadership theory which emphasizes guiding, mentoring, and enabling teachers to enhance instructional quality. By integrating AI into pedagogical practice, teachers became active agents in curriculum innovation, demonstrating leadership in adopting technology while maintaining ethical and cultural integrity. The results also support principles of AI-integrated pedagogy where technology is leveraged to personalize learning, facilitate engagement, and foster higher-order thinking.

Overall, the program not only enhanced teachers' technical and pedagogical competencies but also influenced their professional behavior, promoting reflective, adaptive and ethically responsible teaching. The establishment of a professional learning community further ensures the sustainability of these improvements, preparing educators to lead transformative Mandarin language education in the AI era.

4. Conclusion

The AI training program for Mandarin language teachers at Yayasan Nusaputera was successfully conducted, resulting in significant improvements in both technical and instructional competencies [1]–[3]. Pre-test and post-test evaluations indicated an increase in average scores from 62.4 to 85.7 reflecting a **37.3% improvement** in participants' understanding[19],[20]. Participant feedback on materials, instructors, methods and benefits yielded average scores above 90%, confirming the program's relevance, effectiveness, and value [21]–[22]. In addition to technical competencies, the program enhanced teachers' soft skills, including communication, collaboration, and creativity, enabling the design of interactive and adaptive learning experiences [23]. These outcomes align with the program's objectives of fostering dynamic instructional leadership, integrating AI into Mandarin teaching and promoting a holistic education model.To ensure sustainability and broader impact, the following strategic actions are recommended:

a) **Continuous Teacher Capacity Building:** Integrate training into routine professional development programs, expanding content to include AI-assisted lesson planning,

speech recognition for Mandarin pronunciation, and portfolio-based assessments [24].

b) **Development of Standardized AI-Based Learning Modules:** Prepare comprehensive internal modules with step-by-step guides, sample activities, and recommended tools to facilitate replication and support new teachers [25].

c) **Collaboration with Educational Technology Developers:** Partner with EdTech companies or universities to access the latest innovations and develop contextualized, interactive Mandarin learning applications [26].

d) **Enhancement of Digital School Facilities:** Provide adequate computers or tablets, stable internet, and smart classrooms to optimize AI integration and hybrid learning [27], [28].

e) **Long-Term Impact Evaluation:** Monitor AI implementation over six to twelve months to assess student competency, teacher satisfaction, and instructional effectiveness, supporting research and publication [29], [30].

f) **Strengthening Instructional Leadership:** Engage school principals and foundation leaders to guide, motivate, and provide space for teachers to experiment with AI-based strategies, ensuring sustained innovation [26], [31].

By implementing these strategic actions, AI training can evolve from a single intervention into a continuous, transformative, and sustainable process. This program provides a replicable model for digital transformation in language education, contributing to long-term improvement in teacher competence and holistic student development [31].

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The data supporting this study are available from the corresponding author upon reasonable request.

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Author Contributions Statement:

Name of Author	C	M	So	Va	Fo	I	R	D	W

Author Sheyra Silvia Siregar	✓	✓	✓	✓	✓	✓	✓	✓
Author 2 Ria Riski Marsuki		✓				✓	✓	✓
Author 1 Sheyra Silvia Siregar	✓		✓	✓		✓		✓
Author 2 Ria Riski Marsuki					✓		✓	✓

C : Conceptualization
M : Methodology
So : Software
Va : Validation
Fo : Formal analysis
I : Investigation
R : Resources
D : Data Curation
W : Writing - Review

Biographies of Authors

Sheyra Silvia Siregar works at Universitas Negeri Semarang as a lecturer and researcher. She was born on July 15, 1989, in Indraputa, Sumater Utara. Sheyra is a lecturer in the Mandarin Language Education Study Program at Universitas Negeri Semarang (UNNES). She completed her Bachelor's degree in Mandarin Language and Literature and pursued a Master's degree in Teaching Chinese to Speakers of Other Languages (MTCSOL). Her areas of expertise include applied linguistics, teaching Mandarin as a foreign language, translation studies and the application of Artificial Intelligence (AI) in language education. She is actively engaged in the Tri Dharma of Higher Education, producing scholarly articles, media publications and intellectual works. She can be reached by email at sheyra89@mail.unnes.ac.id.

Ria Riski Marsuki is a lecturer in the Mandarin Language Education Study Program at Universitas Negeri Semarang (UNNES). She completed her Bachelor's degree in Mandarin Language and Literature and pursued a Master's degree in Teaching Chinese to Speakers of Other Languages (MTCSOL). Her expertise lies in **applied linguistics**, Mandarin language teaching, Ria Riski Marsuki welcomes communication and collaboration, and he can be reached via email at mailto:riariskimarsuki@mail.unnes.ac.id