

Strengthening Teachers' Digital Cultural Pedagogical Competence through a Local Culture-Based Professional Development Program

Isah Cahyani^{1*}, Yeti Mulyati², Vismaia S. Damaianti³, Siti Arina Hasanah⁴

¹ Universitas Pendidikan Indonesia, Indonesia, email: isah_cahyani@upi.edu

² Universitas Pendidikan Indonesia, Indonesia, email: yetimulyati@upi.edu

³ Universitas Pendidikan Indonesia, Indonesia, email: vismaia@upi.edu

⁴ Universitas Pendidikan Indonesia, Indonesia, email: sitiarina03@upi.edu

ARTICLE INFO

Article History:

Received June 25, 2026

Accepted July 20, 2026

Available online July 30, 2026

Kata Kunci:

Kompetensi Pedagogik Budaya
Digital; Budaya Lokal;
Pengembangan Profesional Guru;
Pengabdian kepada Masyarakat

Keywords:

Digital Cultural Pedagogical
Competence; Local Culture;
Professional Development;
Teacher Capacity Building

This is an open access article under the
[CC BY-SA](#) license.

Copyright ©2026 by Author. Published
by Institute of Education and Social
Research

ABSTRAK

Perkembangan teknologi digital telah mengubah praktik pendidikan secara signifikan sehingga guru dituntut tidak hanya memiliki literasi digital, tetapi juga mampu mengintegrasikan nilai-nilai budaya lokal ke dalam proses pembelajaran. Namun, masih banyak guru yang mengalami kesulitan dalam merancang pembelajaran digital yang responsif terhadap budaya dan sesuai dengan karakteristik peserta didik. Program pengabdian kepada masyarakat ini bertujuan untuk memperkuat Digital Cultural Pedagogical Competence (DCPC) guru melalui program pengembangan profesional berbasis budaya lokal. Kegiatan dilaksanakan dengan pendekatan partisipatif yang meliputi analisis kebutuhan, pelatihan interaktif, lokakarya penyusunan perangkat pembelajaran, simulasi pembelajaran, pendampingan, dan evaluasi reflektif. Peserta merupakan guru sekolah yang didampingi untuk mengintegrasikan sumber belajar berbasis budaya lokal ke dalam pembelajaran digital. Evaluasi dilakukan melalui pre-test dan post-test, observasi, serta angket umpan balik peserta. Hasil kegiatan menunjukkan adanya peningkatan pemahaman guru mengenai pedagogi responsif budaya, kemampuan menyusun perangkat pembelajaran digital berbasis budaya lokal, serta kepercayaan diri dalam menerapkan strategi pembelajaran inovatif. Selain itu, peserta berhasil menghasilkan rancangan pembelajaran dan media digital yang mengakomodasi kearifan lokal sehingga mampu meningkatkan keterlibatan dan pengalaman belajar peserta didik secara lebih bermakna. Program ini terbukti efektif dalam memperkuat kompetensi pedagogik digital berbasis budaya guru serta dapat dijadikan model pengembangan profesional berkelanjutan bagi peningkatan kualitas pembelajaran yang responsif terhadap budaya dan didukung teknologi digital.

ABSTRACT

The rapid development of digital technology has significantly transformed educational practices, requiring teachers to strengthen not only their digital literacy but also their ability to integrate local cultural values into classroom instruction. However, many teachers still experience difficulties in designing culturally responsive digital learning that reflects students' local identities and learning contexts. This community service program aimed to strengthen teachers' Digital Cultural Pedagogical Competence (DCPC) through a local culture-based professional development program. The program employed participatory training methods consisting of needs assessment, interactive workshops, collaborative lesson design, classroom simulation, mentoring, and reflective evaluation. The participants were school teachers who were guided to integrate local cultural resources into digitally supported learning activities. The evaluation was conducted using pre- and post-training assessments, observation, and participant feedback

questionnaires. The results demonstrated significant improvements in teachers' understanding of culturally responsive pedagogy, their ability to design digital learning materials incorporating local cultural values, and their confidence in implementing innovative teaching practices. Participants also produced contextual lesson plans and digital learning media that reflected local wisdom while promoting student engagement and meaningful learning experiences. Overall, the professional development program effectively enhanced teachers' Digital Cultural Pedagogical Competence and provided a sustainable model for integrating local culture into digital education. This program contributes practical implications for teacher professional development initiatives and supports the implementation of culturally responsive and technology-enhanced education.

INTRODUCTION

The rapid advancement of digital technology has transformed educational practices worldwide, requiring teachers to continuously adapt their pedagogical approaches to meet the demands of twenty-first-century learning. Beyond mastering digital tools, teachers are expected to facilitate learning environments that promote critical thinking, creativity, collaboration, communication, and lifelong learning competencies (Organisation for Economic Co-operation and Development [OECD], 2023). Consequently, teachers are no longer viewed merely as knowledge transmitters but as learning designers who create meaningful, student-centered, and contextually relevant learning experiences.

The growing adoption of digital technologies, artificial intelligence (AI), learning management systems, and interactive learning platforms has expanded opportunities for innovative instruction. Nevertheless, technological advancement alone does not guarantee improvements in educational quality. The UNESCO Global Education Monitoring Report (2023) emphasizes that technology should function as a means to strengthen pedagogy, educational equity, learner engagement, and inclusion rather than becoming the primary objective of educational transformation. Likewise, the UNESCO AI Competency Framework for Teachers (2024) highlights that teachers need competencies extending beyond operational digital skills, including the ability to critically evaluate digital resources, integrate AI responsibly, and design ethical and culturally responsive learning experiences.

From the perspective of teacher professional competence, pedagogical knowledge remains the foundation for effective learning. Shulman (1987) introduced the concept of Pedagogical Content Knowledge (PCK), explaining that effective teaching depends on teachers' ability to transform subject matter into meaningful learning experiences. This framework was further developed through the Technological Pedagogical Content Knowledge (TPACK) model proposed by Mishra and Koehler (2006), which emphasizes the integration of technological, pedagogical, and content knowledge. Although TPACK has become one of the most widely adopted frameworks for digital learning, recent studies suggest that cultural knowledge remains insufficiently represented, particularly in multicultural educational contexts where learning should reflect students' cultural identities and community values (Xu et al., 2025).

In Indonesia, the implementation of digital learning continues to face significant challenges. Many teachers have successfully adopted digital platforms for instructional delivery; however, learning materials often remain standardized and pay limited attention to local cultural values and community knowledge. As a result, classroom learning tends to emphasize technological utilization without adequately connecting learning content to students' social and cultural environments. This condition reduces opportunities for students to experience contextual, meaningful, and culturally responsive learning. At the same time, many teachers

have limited access to professional development programs specifically designed to strengthen their competence in integrating digital technology with local cultural resources.

Educational scholars increasingly recognize that meaningful learning should connect academic knowledge with learners' real-life experiences. Fullan et al. (2018) argue that deep learning develops global competencies through authentic learning experiences integrating knowledge, character, collaboration, creativity, communication, citizenship, and critical thinking. Similarly, the OECD Learning Compass 2030 (OECD, 2023) positions student agency, well-being, and transformative competencies as fundamental objectives of future education. These perspectives reinforce the importance of designing digital learning that is not only technologically innovative but also culturally meaningful and socially relevant.

Local culture represents a valuable educational resource for creating contextual learning experiences. UNESCO (2024) recognizes cultural diversity as an essential pillar of quality education, encouraging educational institutions to preserve local heritage while preparing learners to participate actively in a globally connected society. Integrating local wisdom, traditions, arts, languages, and community practices into digitally supported learning enables teachers to contextualize instruction, strengthen students' cultural identity, and improve engagement and learning motivation. Therefore, combining digital pedagogy with local cultural integration offers a strategic approach to enhancing both educational quality and cultural sustainability.

Based on these challenges, a local culture-based professional development program was implemented as a community service initiative to strengthen teachers' Digital Cultural Pedagogical Competence (DCPC). The program employed participatory approaches involving needs assessment, workshops, collaborative lesson planning, classroom simulations, mentoring, and reflective evaluation. Through these activities, teachers were equipped with practical knowledge and skills to integrate local cultural resources into digitally supported learning while improving their pedagogical competence and instructional creativity.

This community service program aims to strengthen teachers' Digital Cultural Pedagogical Competence through a Local Culture-Based Professional Development Program. Specifically, the program seeks to enhance teachers' capacity to design culturally responsive digital learning, develop instructional materials that incorporate local cultural values, and promote sustainable professional development practices. The outcomes of this program are expected to provide an applicable model for teacher capacity building that supports meaningful digital learning while preserving local cultural heritage.

METHOD

Program Design

This study employed a community service (Pkm) approach using a participatory professional development model to strengthen teachers' Digital Cultural Pedagogical Competence (DCPC). The program was designed to enhance teachers' capacity to integrate local cultural values into digitally supported learning through collaborative, practice-oriented activities. The implementation emphasized active participation, reflection, and continuous mentoring to ensure that teachers could apply the acquired knowledge in their classroom practices.

Participants and Program Setting

The community service program was conducted in collaboration with partner schools involving teachers from various subject areas. Participants were selected based on their willingness to improve digital pedagogical competence and their involvement in classroom instruction. School principals and education stakeholders also participated in several sessions to support the sustainability of the program. The activities were implemented at the partner schools through face-to-face workshops complemented by digital learning activities.

Program Implementation

The professional development program consisted of five sequential stages.

Needs Assessment. The initial stage aimed to identify teachers' existing competencies, challenges, and expectations regarding digital learning and local culture integration. Data were collected through interviews, questionnaires, and group discussions with participating teachers and school administrators.

Interactive Workshops. Based on the needs assessment, workshops were conducted to introduce the concepts of Digital Cultural Pedagogical Competence, culturally responsive pedagogy, digital learning strategies, and the integration of local cultural resources into classroom instruction. Participants also explored examples of technology-supported learning practices that incorporated local wisdom.

Collaborative Lesson Design. Teachers worked collaboratively in small groups to develop lesson plans, digital learning media, and classroom activities integrating local cultural values with digital technology. Facilitators provided guidance throughout the design process to ensure that instructional materials aligned with curriculum objectives and students' learning needs.

Classroom Simulation and Mentoring. Participants implemented their lesson designs through teaching simulations followed by structured feedback sessions. Continuous mentoring was provided to assist teachers in refining instructional strategies, improving digital learning resources, and strengthening the integration of local culture into classroom practices.

Reflection and Follow-up Evaluation. At the end of the program, participants engaged in reflective discussions to evaluate their learning experiences, identify remaining challenges, and formulate action plans for sustaining the implementation of culturally responsive digital pedagogy in their respective schools.

Program Evaluation

The effectiveness of the professional development program was evaluated using both quantitative and qualitative approaches. Quantitative evaluation was conducted through pre-test and post-test assessments measuring participants' understanding of digital pedagogy, culturally responsive teaching, and local culture integration. Qualitative evaluation involved classroom observations, participant reflections, facilitator field notes, and feedback questionnaires to examine changes in teachers' pedagogical practices, confidence, and professional engagement throughout the program.

Indicators of Program Success

The success of the community service program was measured using several indicators, including: (1) increased teacher knowledge regarding Digital Cultural Pedagogical Competence; (2) improved ability to design digital learning materials integrating local cultural values; (3)

enhanced confidence in implementing culturally responsive digital learning; (4) the production of contextual lesson plans and digital instructional media based on local culture; and (5) positive participant responses regarding the relevance, usefulness, and sustainability of the professional development program.

Data Analysis

The evaluation data were analyzed using descriptive quantitative and qualitative techniques. Pre-test and post-test results were summarized using descriptive statistics to identify changes in participants' competencies before and after the program. Qualitative data obtained from observations, reflective discussions, questionnaires, and facilitator documentation were analyzed through thematic analysis following the stages of data reduction, data display, and conclusion drawing as proposed by Miles, Huberman, and Saldaña (2014). The integration of quantitative and qualitative findings provided a comprehensive evaluation of the effectiveness of the professional development program in strengthening teachers' Digital Cultural Pedagogical Competence through local culture-based learning.

RESULT AND DISCUSSION

Strengthening Teachers' Pedagogical Competence through Professional Development

Teacher pedagogical competence serves as the cornerstone of effective teaching because it enables teachers to transform disciplinary knowledge into meaningful learning experiences that accommodate students' cognitive, social, emotional, and cultural development. Beyond mastering instructional techniques, pedagogical competence encompasses teachers' ability to understand learners' characteristics, design effective learning environments, implement appropriate instructional strategies, assess learning outcomes, and continuously improve instructional practices through reflective teaching (Shulman, 1987). Therefore, strengthening pedagogical competence has become an essential component of teacher professional development, particularly in response to the rapid transformation of educational practices in the digital era.

The professional development program began by reinforcing participants' understanding of pedagogical competence as the foundation for designing meaningful and student-centered learning. During the training sessions, teachers explored the principles of effective pedagogy and reflected on their existing classroom practices through collaborative discussions and case-based learning activities. This approach encouraged participants to identify instructional challenges and develop practical strategies for improving learning quality in accordance with students' needs and learning contexts.

The training activities were grounded in the concept of Pedagogical Content Knowledge (PCK) introduced by Shulman (1986, 1987), which emphasizes that effective teaching requires the integration of subject matter knowledge and pedagogical knowledge. Teachers were guided to transform academic content into meaningful learning experiences by selecting appropriate instructional strategies, contextual examples, collaborative activities, and authentic assessment methods. This understanding enabled participants to recognize that effective teaching extends beyond content delivery and requires careful pedagogical decision-making that considers students' characteristics and learning objectives.

The workshops also emphasized contemporary perspectives on teacher competence that highlight the importance of integrating cognitive, social, emotional, and cultural dimensions into

instructional design. Darling-Hammond et al. (2020) argue that high-quality teaching requires teachers to create inclusive and learner-centered environments that promote critical thinking, creativity, collaboration, and lifelong learning. Consistent with the OECD Learning Compass 2030 (OECD, 2023), participants were encouraged to design learning experiences that foster student agency, well-being, and transformative competencies rather than focusing solely on knowledge acquisition.

Considering the rapid digital transformation of education, the program further introduced the role of digital technology in strengthening pedagogical practice. Referring to the UNESCO AI Competency Framework for Teachers (UNESCO, 2024), participants discussed how digital technologies should be employed to enrich learning experiences while maintaining ethical principles, meaningful interaction, and learner engagement. Rather than positioning technology as the primary objective, the training emphasized its role as a pedagogical tool that supports instructional quality and facilitates active learning.

Throughout the professional development program, teachers demonstrated increased awareness of the need to continuously improve their pedagogical competence in response to technological and educational changes. Reflective discussions revealed that participants recognized the importance of designing learning experiences that are adaptive, interactive, and responsive to students' diverse learning characteristics. These findings indicate that strengthening pedagogical competence constitutes the essential first step before teachers are introduced to more specific competencies, including the integration of local culture into digitally supported learning. Consequently, this initial stage established a strong pedagogical foundation for the subsequent activities focusing on Digital Cultural Pedagogical Competence.

Integrating Local Culture into Digital Pedagogical Practice

Following the strengthening of teachers' pedagogical competence, the professional development program focused on enhancing participants' ability to integrate local cultural values into digitally supported learning. This stage emphasized that effective digital pedagogy should not merely utilize technology but should also connect learning with students' cultural identities, community experiences, and local wisdom. During the workshops and collaborative discussions, participants explored various forms of local cultural resources, including traditional practices, local history, indigenous knowledge, arts, language, and community values, as authentic learning resources that could enrich classroom instruction.

The training activities demonstrated that digital learning becomes more meaningful when instructional content reflects learners' social and cultural contexts. Participants were encouraged to redesign existing lesson plans by incorporating local cultural elements into digital learning media, collaborative projects, and contextual classroom activities. This approach strengthened teachers' awareness that technology functions as a pedagogical instrument for facilitating meaningful learning rather than as an end in itself. Such practices are consistent with the UNESCO Global Education Monitoring Report (UNESCO, 2023), which emphasizes that educational technology should enhance pedagogy, learner engagement, inclusion, and educational quality instead of determining instructional practices.

The integration of local culture into digital pedagogy was also supported by the UNESCO AI Competency Framework for Teachers (UNESCO, 2024), which highlights that teachers should possess competencies enabling them to critically select digital resources, design ethical learning environments, and preserve human values while utilizing emerging technologies. Throughout

the training, participants discussed practical strategies for combining digital technologies with local cultural content so that technology could strengthen rather than replace meaningful interaction between teachers, students, and their communities.

The implementation of the program was further informed by contemporary perspectives on teacher professional competence. Darling-Hammond et al. (2020) argue that effective teaching requires the integration of cognitive, social, emotional, and cultural dimensions into instructional design. Likewise, the OECD Learning Compass 2030 (OECD, 2023) emphasizes learner agency, well-being, and transformative competencies as central educational goals. These perspectives guided participants in designing learning activities that promoted critical thinking, collaboration, creativity, and cultural appreciation through authentic learning experiences rooted in students' local environments.

During collaborative lesson-design sessions, participants recognized that local culture should not be viewed merely as supplementary instructional content but as a valuable pedagogical resource that supports conceptual understanding and student engagement. This perspective is consistent with the sociocultural theory of Vygotsky (1978), which explains that knowledge is constructed through interaction with cultural tools and social practices. Similarly, the concept of Funds of Knowledge proposed by Moll et al. (1992) emphasizes that communities possess rich cultural and experiential resources that can significantly enrich classroom learning. By utilizing these resources, teachers were able to create learning activities that were more contextual, relevant, and meaningful for students.

The activities also introduced participants to the importance of integrating digital technology with reflective instructional design. Rather than selecting digital applications solely because of their technological features, teachers were encouraged to evaluate whether the chosen technologies supported inquiry, collaboration, conceptual understanding, and cultural relevance. This approach aligns with the principles of deep learning proposed by Fullan et al. (2018), which emphasize authentic learning experiences that develop critical thinking, creativity, communication, collaboration, citizenship, and character.

Throughout the mentoring sessions, participants demonstrated increased confidence in developing digital learning resources that incorporated local cultural values. The collaboratively developed lesson plans showed greater contextual relevance by connecting curriculum content with local traditions, community practices, and cultural heritage while maintaining alignment with learning objectives. These outcomes indicate that integrating local culture into digital pedagogy not only enriches instructional quality but also strengthens teachers' capacity to create inclusive, culturally responsive, and technology-enhanced learning environments.

This stage of the professional development program successfully strengthened teachers' understanding of Digital Cultural Pedagogical Competence by demonstrating that meaningful digital learning emerges from the balanced integration of pedagogical expertise, technological literacy, and local cultural knowledge. The experience gained during the workshops and mentoring activities established a practical foundation for teachers to implement culturally responsive digital learning in their respective classrooms while preserving local cultural identity in the era of educational digitalization.

CONCLUSION

The local culture-based professional development program successfully strengthened teachers' Digital Cultural Pedagogical Competence by enhancing their understanding of

culturally responsive pedagogy, improving their ability to integrate local cultural values into digitally supported learning, and increasing their confidence in designing meaningful instructional activities. Through a series of needs assessments, interactive workshops, collaborative lesson design, classroom simulations, mentoring, and reflective evaluation, participants developed practical competencies in utilizing digital technology while preserving local cultural identity. The program demonstrated that meaningful digital learning is achieved not merely through the use of technology but through the effective integration of pedagogical knowledge, digital literacy, and local cultural resources to create contextual, inclusive, and student-centered learning experiences.

The implementation of this community service program provides a practical model for strengthening teacher professionalism through sustainable professional development. The integration of local culture into digital pedagogy encourages teachers to design learning experiences that are relevant to students' social and cultural contexts while fostering critical thinking, creativity, collaboration, communication, and cultural literacy. Therefore, continuous collaboration among schools, universities, local communities, and educational authorities is recommended to expand similar professional development initiatives, ensuring that digital transformation in education remains culturally responsive, sustainable, and capable of improving the quality of teaching and learning.

REFERENCES

- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- Fullan, M., Quinn, J., & McEachen, J. (2018). *Deep learning: Engage the world, change the world*. Corwin.
- Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.
- Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465–491. <https://doi.org/10.3102/00028312032003465>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054.
- Moll, L. C., Amanti, C., Neff, D., & González, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory Into Practice*, 31(2), 132–141. <https://doi.org/10.1080/00405849209543534>
- Organisation for Economic Co-operation and Development. (2023). *OECD learning compass 2030*. OECD Publishing.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14. <https://doi.org/10.3102/0013189X015002004>
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–22. <https://doi.org/10.17763/haer.57.1.j463w79r56455411>
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO.
- UNESCO. (2024). *AI competency framework for teachers*. UNESCO.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Xu, Y., Zhang, Z., & Lai, C. (2025). Culture-DPACK: A TPACK scale for evaluating Chinese language teachers' perceptions of integrated literacies. *Education and Information Technologies*, 30, 19329–19361.