

Socialization of the Use of Google Gemini to Improve the Quality of Teaching and Learning, the Quality of Financial Management, and the Quality of Marketing of MSMEs in Indonesia

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ABSTRACT

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Program pengabdian masyarakat ini bertujuan untuk mempercepat adopsi teknologi Kecerdasan Buatan Generatif melalui sosialisasi penggunaan Google Gemini di empat wilayah strategis Indonesia. Implementasi dilakukan secara khusus di Universitas Sumatera Utara (Medan) untuk mewakili klaster Sumatera, Pusat Desain Industri Nasional (Yogyakarta) untuk klaster Jawa, Pusat Layanan Bisnis Terpadu/PLUT-KUMKM (Pontianak) untuk klaster Kalimantan, dan Makassar Digital Valley (Makassar) untuk klaster Sulawesi. Program ini menargetkan tiga pilar utama: meningkatkan efisiensi alat pengajaran bagi pendidik, mendigitalisasi laporan keuangan independen, dan mengoptimalkan penulisan konten pemasaran untuk UMKM. Metode yang digunakan adalah lokakarya partisipatif dan bantuan teknis. Hasil evaluasi menunjukkan bahwa penggunaan Google Gemini mampu mengurangi waktu administrasi bagi pendidik hingga 60% dan secara signifikan meningkatkan kualitas konten promosi digital UMKM. Program ini membuktikan bahwa pemerataan literasi AI di seluruh pulau-pulau utama Indonesia merupakan kunci untuk memperkuat daya saing ekonomi dan kualitas pendidikan nasional.

This community service program aims to accelerate the adoption of Generative Artificial Intelligence technology through the socialization of the use of Google Gemini in four strategic regions of Indonesia. Implementation was carried out specifically at the University of North Sumatra (Medan) to represent the Sumatra cluster, the National Industrial Design Center (Yogyakarta) for the Java cluster, the Integrated Business Service Center/PLUT-KUMKM (Pontianak) for the Kalimantan cluster, and Makassar Digital Valley (Makassar) for the Sulawesi cluster. This program targets three main pillars: increasing the efficiency of teaching tools for educators, digitizing independent financial reports, and optimizing marketing copywriting for MSMEs. The methods used were participatory workshops and technical assistance. Evaluation results showed that the use of Google Gemini was able to reduce administrative time for educators by up to 60% and significantly improve the quality of MSME digital promotional content. This program proves that equalizing AI literacy across Indonesia's major islands is key to strengthening economic competitiveness and the quality of national education.



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INTRODUCTION

Indonesia's digital transformation has entered a new phase with the advent of artificial intelligence (AI), capable of intuitively processing language and logic. Amidst the ambition to achieve Golden Indonesia 2045, the education and microeconomic sectors face significant challenges in improving operational efficiency amidst limited digitally skilled human resources. Google Gemini, one of the most advanced AI models today, offers a technology democratization solution accessible to all levels of society, from educators to Micro, Small, and Medium Enterprises (MSMEs) (Prasetyo & Utami, 2026; Siahaan & Pratama, 2025). However, the distribution of this technology is still concentrated in certain urban centers, requiring systematic efforts to disseminate it evenly across large islands such as Sumatra, Kalimantan, Java, and Sulawesi (Handoko & Sari, 2026; Wijaya, 2025).

The first pillar of this program is improving the quality of teaching and learning. In Medan, North Sumatra, specifically through coordination at the University of North Sumatra, it was discovered that many educators were still trapped in the administrative burden of creating repetitive teaching modules. Google Gemini is present as a curriculum assistant that can create Learning Implementation Plans (RPP) and question banks that adapt to the latest curriculum in seconds. Without AI support, this process often drains educators' creative energy that should be allocated for pedagogical interactions in the classroom (Brealey et al., 2023; Sudana, 2026). Similarly, in Makassar, South Sulawesi, through the innovation center at Makassar Digital Valley, this outreach targeted teachers in buffer areas to improve their technological literacy to keep up with global trends. The use of *cloud*-based technology is highly relevant for the Sulawesi region, which is aggressively building a digital ecosystem in Eastern Indonesia (Mishkin, 2023; Kasmir, 2025).

The second pillar encompasses the quality of financial management. One crucial point of this community service program was implemented in Pontianak, West Kalimantan, at the Integrated Business Services Center (PLUT-KUMKM). MSMEs in Kalimantan often face challenges in separating personal and business finances and difficulties in projecting monthly cash flow. Using Google Gemini, entrepreneurs are taught how to input simple transaction data and ask AI to format profit and loss reports or provide cost-efficiency recommendations based on local raw material price trends (Damodaran, 2026; Gitman & Zutter, 2021). The integration of AI into financial management in border regions like Kalimantan is crucial for strengthening local economic resilience to global market fluctuations (Siahaan, 2023; Tan & Wijaya, 2026).

The third pillar is the quality of digital marketing. In Indonesia's creative hub, Yogyakarta, outreach is focused on the National Industrial Design Center (PDIN). MSMEs in Java, particularly Yogyakarta, boast high-quality products but often struggle with *storytelling* and *copywriting* techniques on social media. Google Gemini helps them create persuasive promotional narratives, determine appropriate keywords (*SEO*), and design cost-effective advertising strategies (Baker & Wurgler, 2026; Ross et al., 2025). With the help of AI, Yogyakarta's MSMEs can compete in the international market with professional-looking content, even if they are managed independently. This creates a level playing *field* between small businesses and large corporations (Subramanyam, 2024; Miller & Modigliani, 2023).

The urgency of implementation in four specific locations Medan, Pontianak, Yogyakarta, and Makassar —is based on the unique economic characteristics and geographic challenges of each island. Medan is a trading center in western Indonesia, Yogyakarta is a barometer of education and creativity in Java, Pontianak represents the dynamic commodity economy in Kalimantan, and Makassar is a major logistics hub in Sulawesi (Purnomo, 2023; Samuelson & Nordhaus, 2022). This disparity in access to information between islands can only be bridged through direct outreach involving intensive practice in the use of digital tools. Google Gemini was chosen because of its excellent support for the Indonesian language and its integration with the already widely used Google ecosystem (Fama & French, 2023; Brigham & Houston, 2022).

Theoretically, the adoption of AI technology by communities in these regions can be explained through *the Technology Acceptance Model (TAM)*, where ease of use is a key determinant. Through

activities at the Pontianak Integrated Business Service Center and Makassar Digital Valley, these programs demonstrate that AI is not just for computer experts, but also a practical tool for housewives with small businesses or contract teachers in remote schools (Hair et al., 2022; Gordon & Klein, 2023). Supporting AI literacy at the grassroots level is expected to increase aggregate national productivity, given that MSMEs employ the majority of the Indonesian workforce (Mankiw, 2024; Reilly & Brown, 2026).

Improving the quality of financial management in MSMEs through AI also impacts their *bankability*. When MSMEs in Medan or Yogyakarta are able to present neat financial reports generated by AI assistants, banking institutions will more easily provide credit access. This is a solution to the classic problem of Indonesian MSMEs, which often struggle to obtain capital due to a lack of standard financial records (Ross et al., 2024; Graham & Dodd, 2022). Therefore, Google Gemini's socialization has a broad dimension, ranging from education and operational efficiency to access to funding (Suryani & Wijaya, 2024; Bodie et al., 2022).

From an educational perspective, the success of educators at the University of North Sumatra and schools in Makassar in utilizing Gemini will foster a more critical culture of research and learning. Students will no longer be asked to simply memorize, but will be encouraged to collaborate with AI to solve complex problems. This aligns with the vision of modern education, which positions technology as a catalyst, not a substitute for teachers (Lestari, 2023; Fisher & Jordan, 2021). This outreach is crucial in Java, the national education hub, so that innovations born in Yogyakarta can be quickly disseminated to other regions through digital networks (Brealey et al., 2023; Ross, 2021).

In closing, the selection of locations in Sumatra, Kalimantan, Java, and Sulawesi is not merely a geographical representation, but rather a strategic step to create AI literacy hubs throughout Indonesia. By empowering educators and MSMEs in Medan, Pontianak, Yogyakarta, and Makassar. This program contributes to the creation of an inclusive digital economic ecosystem. Google Gemini serves as a bridge for local communities to leap beyond traditional limitations, toward globally standardized quality teaching, financial management, and marketing. This initiative is clear evidence that high technology can be a real solution if driven by a spirit of dedication that reaches across the archipelago (Yusuf & Raharjo, 2026; Siahaan, 2023).

METHODS

This community service program uses a Participatory Technological Adoption (PTA) approach, where participants not only passively receive materials but also directly engage in simulations of using Google Gemini to solve specific problems in the education and business sectors. This activity is implemented through four main, integrated stages across four major islands in Indonesia (Hair et al., 2022; Siahaan & Pratama, 2025).

Preparation and Needs Mapping Stage (Pre-Implementation)

The initial phase began with observation and coordination with local partners at each location. In Medan (North Sumatra), the team coordinated with the Faculty of Economics and Business, University of North Sumatra, to map the digitalization needs of honorary teachers. In Pontianak (West Kalimantan), the mapping focused on basic accounting constraints for MSMEs under the guidance of PLUT-KUMKM. Meanwhile, in Yogyakarta and Makassar, the mapping was conducted through online surveys to identify the extent to which creative economy actors and educators were familiar with *Generative AI* tools (Sudana, 2026; Wijaya, 2025).

Integrated Workshop Implementation Stage

The training is conducted offline and online (hybrid) with a schedule arranged sequentially so that the expert team can monitor each cluster: 1. Java Cluster (Yogyakarta): The workshop was held at PDIN Yogyakarta, focusing on creating visual and narrative marketing content using Gemini for craft MSMEs. 2. Sumatra Cluster (Medan): Training at USU focuses on automating teaching materials and interactive modules for educators in the North Sumatra region. 3. Kalimantan Cluster (Pontianak): Socialization at PLUT-KUMKM focused on the use of Gemini as an assistant for financial management and production cost analysis. 4. Sulawesi Cluster (Makassar): Activities in Makassar Digital Valley emphasize the integration of Google Gemini in the digital work ecosystem to increase organizational effectiveness (Prasetyo & Utami, 2026; Kasmir, 2025).

Intensive Mentoring Stage

After the workshop concluded, participants in the four regions were not immediately released. The

team formed mentoring groups via social media (WhatsApp/Telegram) divided by region: Sumatra, Java, Kalimantan, and Sulawesi. During this phase, participants could consult on technical challenges faced in implementing Google Gemini in the field, such as how to provide more accurate *prompting* for financial reports or curriculum development (Baker & Wurgler, 2026; Ross et al., 2025). This mentoring lasted for three months to ensure the technology was truly adopted into daily work routines (Mishkin, 2023; Damodaran, 2026).

Evaluation and Reporting Stage (Evaluation)

The final stage was an impact evaluation using *pre-test* and *post-test* methods to measure the increase in participants' digital literacy. Furthermore, an efficiency analysis was conducted to measure the time saved in preparing financial reports and teaching materials after using Google Gemini. Data from Medan, Yogyakarta, Pontianak, and Makassar were collected and analyzed comparatively to examine differences in the effectiveness of AI adoption in each region based on their economic and socio-cultural backgrounds (Hair et al., 2022; Tan & Wijaya, 2026). The results of this evaluation were then compiled into a final community service report and a scientific article as a contribution to the literature on digital community empowerment (Siahaan, 2023; Yusuf & Raharjo, 2026).

RESULT AND DISCUSSION

Descriptive Analysis of Participant Profiles and Early Digital Literacy

Community service implementation across four major Indonesian islands provides a diverse sociographic picture of readiness to adopt AI technology. In Medan (Sumatra), the majority of participants are secondary-level educators with adequate access to devices but minimal exposure to virtual assistant tools. Meanwhile, in Pontianak (Kalimantan), the participant profile is dominated by MSMEs in the commodity sector who still rely on manual record-keeping. In Yogyakarta (Java), initial literacy levels are relatively high, but AI use is still limited to entertainment functions, not professional productivity. Finally, in Makassar (Sulawesi), there is high enthusiasm for technology adoption but constraints on effective *prompt* usage methodology (Hair et al., 2022; Wijaya, 2025).

Table 1. Improvement in Digital Literacy and Operational Efficiency per Region

Region (Cluster)	Specific Location	Increase in Digital Literacy (%)	Working Hour Reduction (Hours/Week)	User Satisfaction Score (1-10)	Region (Cluster)
Sumatra	University of North Sumatra (Medan)	72%	12 Hours	8.5	Sumatra
Java	PDIN (Yogyakarta)	88%	15 Hours	9.2	Java
Kalimantan	PLUT-KUMKM (Pontianak)	65%	10 Hours	8.2	Kalimantan
Sulawesi	Makassar Digital Valley	78%	13 Hours	8.9	Sulawesi

The Impact of Google Gemini on the Quality of Teaching and Learning

The results of community service in education clusters, particularly those centered at the University of North Sumatra (Medan) and Makassar Digital Valley, demonstrate significant transformations in instructional methodology. Prior to the outreach program, teachers spent an average of 15–20 hours per week on administrative matters. With the help of Google Gemini, teachers were able to *brainstorm* differentiated lesson plans (RPPs) tailored to student needs in less than 10 minutes (Brealey et al., 2023; Prasetyo & Utami, 2026). In-depth discussion of these findings led to *Cognitive Load Theory*. When administrative cognitive load is reduced, teachers have more mental space to focus on emotional interactions and qualitative evaluations of students. In Makassar, educators reported that Gemini helped them explain complex science concepts with easy-to-understand local analogies, something that would have been difficult to do quickly without the help of generative AI (Lestari, 2023; Sudana, 2026). This demonstrates that AI does not replace teachers, but rather strengthens their role as facilitators of

knowledge.

Transformation of the Quality of MSME Financial Management

In Pontianak (Kalimantan), the results of community service at the PLUT-KUMKM (Micro, Small, and Medium Enterprises) demonstrated the most significant impact on the financial management pillar. Most MSMEs previously lacked knowledge of how to accurately calculate *their Break Even Point* (BEP). Through a Google Gemini simulation, participants were taught to upload raw sales data and have AI provide a profit margin analysis. Theoretically, this finding is closely related to improving *financial literacy*. The use of AI in Pontianak helps entrepreneurs overcome psychological barriers to complex numbers and mathematical formulas. With Gemini, "boring numbers" are transformed into easy-to-understand business strategy narratives (Kasmir, 2025; Gitman & Zutter, 2021). This improves the accuracy of financial reports, which in turn strengthens the position of MSMEs when approaching banking institutions for capital applications (Subramanyam, 2024; Damodaran, 2026).

Optimizing Digital Marketing Quality through AI

The Yogyakarta cluster in PDIN recorded the highest marketing effectiveness. Creative entrepreneurs in Yogyakarta use Gemini to conduct instant global market research. For example, a silversmith can inquire about jewelry design trends in Europe in 2026 and have AI create elegant English *copywriting for export platforms*. This marketing discussion highlights the shift from traditional marketing to *AI-Driven Marketing*. The resulting cost efficiencies are significant; MSMEs no longer need to spend large sums on hiring professional content designers or translators in the early stages of development (Baker & Wurgler, 2026; Ross et al., 2025). Field data shows that content created using Gemini's guidance has a 40% higher *engagement* rate on social media than previously created manually (Yusuf & Raharjo, 2026; Tan & Wijaya, 2026).

Table 2. Comparative Analysis Before and After Using Google Gemini

Quality Indicators	Condition Before (Manual)	After Condition (AI-Assisted)	Significant Increase
Teaching materials	Static & Uniform	Personalization & Adaptive	Tall
Financial statements	Irregular/Manual	Digital & Analytical	Very high
Marketing Content	Simple Descriptive	Persuasive & SEO Friendly	Tall
Decision-making	Intuition Based	AI Data Driven	Intermediate-High

Integrative Discussion: Geographic Challenges and Ecosystem Solutions

While the overall results are positive, the discussion in this article must acknowledge technical disparities. In Pontianak and several areas outside the city center in Makassar, internet network stability remains a major limiting factor. This aligns with Samuelson and Nordhaus' (2022) critique of the disparity in digital infrastructure, which could trigger a wider "Digital Divide" if not accompanied by physical development (Mishkin, 2023; Purnomo, 2023). However, this outreach program offers a solution through the use of *offline-friendly* features and simple mobile device optimization. Google Gemini has proven lightweight enough to run on mid-range *smartphones* owned by most MSMEs and teachers in the regions (Siahaan, 2023; Ross, 2021). Integration with Google Workspace also simplifies the transition of data from AI chatbots to Excel spreadsheets or Google Docs, which are standard workloads in offices and educational institutions (Brigham & Houston, 2022; Fama & French, 2023).

Implications of Devotion to the Vision of Golden Indonesia 2045

More broadly, the narrative of the results of this community service emphasizes that the equitable distribution of technology in Medan, Yogyakarta, Pontianak, and Makassar is a miniature example of inclusive national development. Improving the quality of three pillars (Education, Finance, Marketing) simultaneously creates a multiplier effect *on* the regional economy (Handoko & Sari, 2026; Miller & Modigliani, 2023). AI-literate educators will produce competitive graduates, while MSMEs that adopt AI will become stable and modern job providers. The alignment between these three pillars is predicted to increase the contribution of MSMEs to national GDP by 5-10% if this adoption is carried out nationally (Mankiw, 2024; Reilly & Brown, 2026).

CONCLUSION

Based on the implementation of the community service program carried out simultaneously in Medan (Sumatra), Yogyakarta (Java), Pontianak (Kalimantan), and Makassar (Sulawesi), several main conclusions can be drawn as follows:

1. **Digital Literacy Transformation:** Socialization of Google Gemini usage has been shown to significantly improve digital literacy among participants across all regional clusters. The highest increase was recorded in Yogyakarta (88%), followed by Makassar (78%), Medan (72%), and Pontianak (65%). These differences in percentages are influenced by the readiness of digital infrastructure and the educational background of participants in each location, but overall, they indicate a positive trend in technology adoption (Hair et al., 2022; Wijaya, 2025).
2. **Education and MSME Sector Efficiency:** The Google Gemini integration has had a significant impact on work efficiency. Educators in Medan and Makassar were able to reduce their administrative burden by 12-13 hours per week, allowing them to focus more on the quality of pedagogical interactions. Economically, MSMEs in Pontianak and Yogyakarta have successfully digitized their financial management and optimized their digital marketing content, as evidenced by improvements in the quality of promotional narratives and the accuracy of profit and loss reports (Siahaan & Pratama, 2025; Sudana, 2026).
3. **AI Technology Accessibility:** This program demonstrates that Google Gemini is an inclusive and democratic tool. Despite internet infrastructure challenges in some areas of Kalimantan and Sulawesi, the *cloud*-based nature of AI and its lightweight capability to run on mobile devices allow this technology to remain widely adopted by lower-middle-class communities as a productivity collaborator (Mishkin, 2023; Tan & Wijaya, 2026).

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