Meta AI for Leadership Training: A Pilot Study on Mobile Social Media–Based Blended and Self-Regulated Learning

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Abstract: This exploratory pilot study investigates the integration of Meta AI into WhatsApp as a mobile-based tool for leadership education compared with traditional book-based methods. Eighteen university students were divided into two groups: one engaged in Blended Learning with Meta AI and Self-Regulated Learning (BMAI-SRL), while the other relied on Blended Learning with SRL but without Meta AI (B-SRL). Data were collected through pre-/post-tests on leadership knowledge, questionnaires measuring critical thinking, self-efficacy, and SRL, as well as open-ended reflections. Both groups demonstrated significant within-group improvements, but no significant differences were found between groups. Thematic analysis revealed that BMAI supported efficiency, personalization, and flexibility but also posed challenges of reliability and distraction, whereas books provided cultural grounding, deeper understanding, and more consistent engagement. Overall, the findings suggest that a blended approach combining the adaptability of AI with the cultural depth of traditional methods may enhance leadership learning, though larger and longer-term studies are needed to validate these findings.

Keywords: Meta AI, Mobile-Assisted Learning, Leadership Training, Self-Efficacy, Critical Thinking, Self-Regulated Learning

1. Introduction

The rapid growth of digital technologies has transformed higher education worldwide, particularly through mobile platforms and artificial intelligence (AI). Generative AI increasingly shapes how students learn, engage, and regulate their studies (Fullan et al., 2024). Mobile-Assisted Learning (MAL) leverages portable devices and ubiquitous connectivity to support continuous access, while AI-powered tools provide adaptive feedback and personalized support (Moya & Camacho, 2024). These developments present opportunities for leadership education, which requires critical thinking, ethical reasoning, decision-making, and communication skills (Effendi et al., 2020). In Indonesia, leadership is deeply rooted in cultural traditions, emphasising collective responsibility, ethical judgment, and spiritual values (Andriyanti et al., 2024). Traditionally cultivated through books, religion, and community, these competencies now face tension as younger generations turn to digital tools and social media.

Self-Regulated Learning (SRL) provides a bridge by promoting autonomy, goal setting, monitoring, and reflection (Zimmerman, 2000). The integration of Meta AI into WhatsApp—a platform with over 86 million active users in Indonesia (Kumar, 2025)—offers potential to embed SRL strategies within interactive digital scaffolding, making leadership training more engaging and learner-centred. Yet, limited empirical research has compared AI-enabled MAL with traditional book-based methods in leadership education. To address this gap, the present study pilots Meta AI integration into WhatsApp and contrasts it with conventional learning, examining their effects on leadership knowledge, critical thinking, self-efficacy, and SRL, while also capturing students' qualitative experiences.

2. Literature Review

2.1 Leadership Training in Higher Education

Leadership training in higher education often combines cognitive, affective, and social learning. It is not only about acquiring theoretical knowledge but also about cultivating character, empathy, and decision-making skills that reflect community and cultural contexts (Effendi et al., 2020). In Indonesia, culturally responsive leadership training emphasizes local wisdom, which integrates religious teachings, collective values, and respect for authority (Andriyanti et al., 2024). Book-based learning remains widely used because it embeds cultural narratives and provides structured content that encourages reflection. At the same time, leadership education faces challenges such as limited engagement, lack of personalization, and difficulty in connecting abstract principles with real-world practice. Emerging digital approaches, particularly those using AI and mobile platforms, offer new ways to engage students. However, scholars caution that cultural grounding must remain central to avoid decontextualized or shallow learning experiences (Fullan et al., 2024).

2.2 Mobile-Assisted Learning and Self-Regulated Learning

MAL provides ubiquitous, interactive, and flexible learning opportunities (Hwang et al., 2024). By leveraging smartphones and social media platforms, learners can access educational content anytime and anywhere. When integrated with AI, MAL can offer dynamic adaptation of content and immediate feedback, supporting all three stages of SRL—forethought, performance, and reflection (Weng et al., 2024). For example, AI can recommend tasks, adjust content difficulty, and provide real-time assessments tailored to learners' progress. These affordances align well with leadership training, where reflection and adaptability are key. However, MAL and AI also introduce challenges: learners may struggle with distractions, misinformation, and variable digital literacy. Moreover, overreliance on AI may reduce deep reflection unless carefully scaffolded. Taken together, the literature suggests that while MAL and AI hold promise for enhancing SRL and leadership competencies, their effectiveness depends on careful integration with cultural values and structured learning designs.

3. Method

As shown in Figure 1, Eighteen undergraduate students from a leadership course at a private university in East Java, Indonesia, participated in a three-week study (December 2024– January 2025), randomly assigned to an experimental group using Blended Learning with Meta AI via WhatsApp and SRL strategies (BMAI-SRL) or a control group using book-based blended learning with SRL but without Meta AI (B-SRL). Both groups attended an initial webinar on leadership styles and local wisdom, followed by self-study using their assigned methods.

As illustrated in Figure 2, students set weekly goals, created study plans, and evaluated their progress. The BMAI-SRL group interacted with a chatbot to request definitions, analyze cases, and explore leadership scenarios, supplemented by textbooks and online articles, while the B-SRL group accessed curated readings without AI support. While Figure 3, show students' interaction with Meta AI via WhatsApp.

Quantitative data included pre- and post-tests (10 items, scored 0–100) and post-intervention questionnaires using 5-point Likert scales on critical thinking (Chai et al., 2015; α = 0.71), self-efficacy (Pintrich et al., 1991; α = 0.79), and SRL (Barnard et al., 2009; α = 0.90). Open-ended questions captured qualitative reflections. Data analysis employed Wilcoxon Signed-Rank tests for within-group changes, Mann–Whitney U tests for between-group comparisons, and gain score analysis for knowledge improvement. Thematic analysis followed GenAI-assisted coding procedures (Turobov et al., 2024), code generation (Step 1), code clustering (Step 2), and developing AI-specific codes (Step 3) and a frequency analysis was conducted to determine how often each code was mentioned across both groups.

Figure 1. Experiment Process


Figure 2. Learning Activity Process

(a) Setting study plan (b) Interactive learning (c) Evaluation
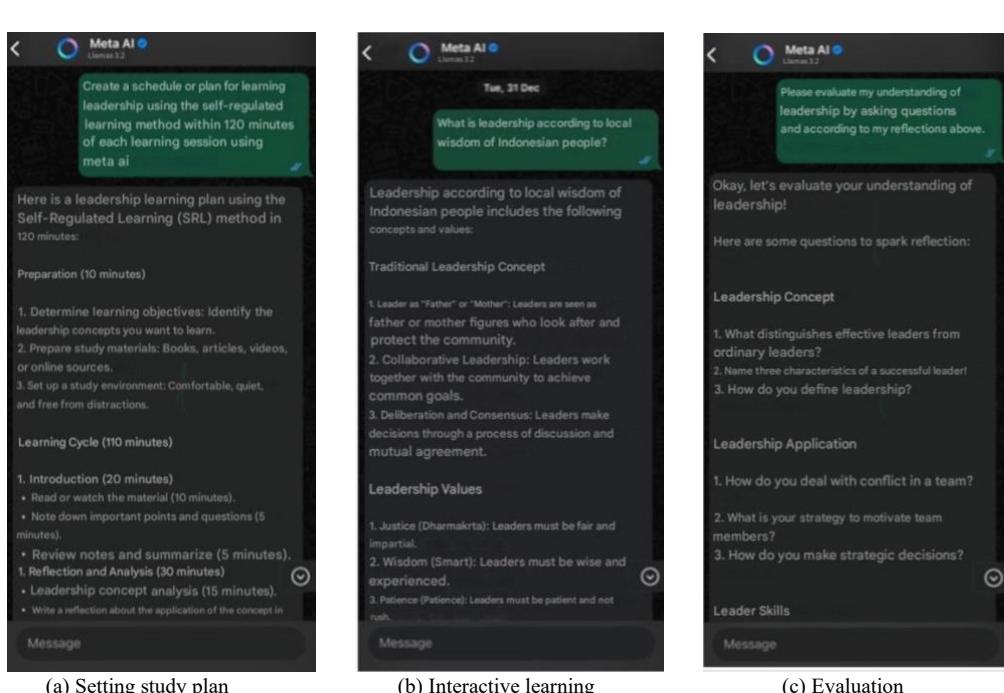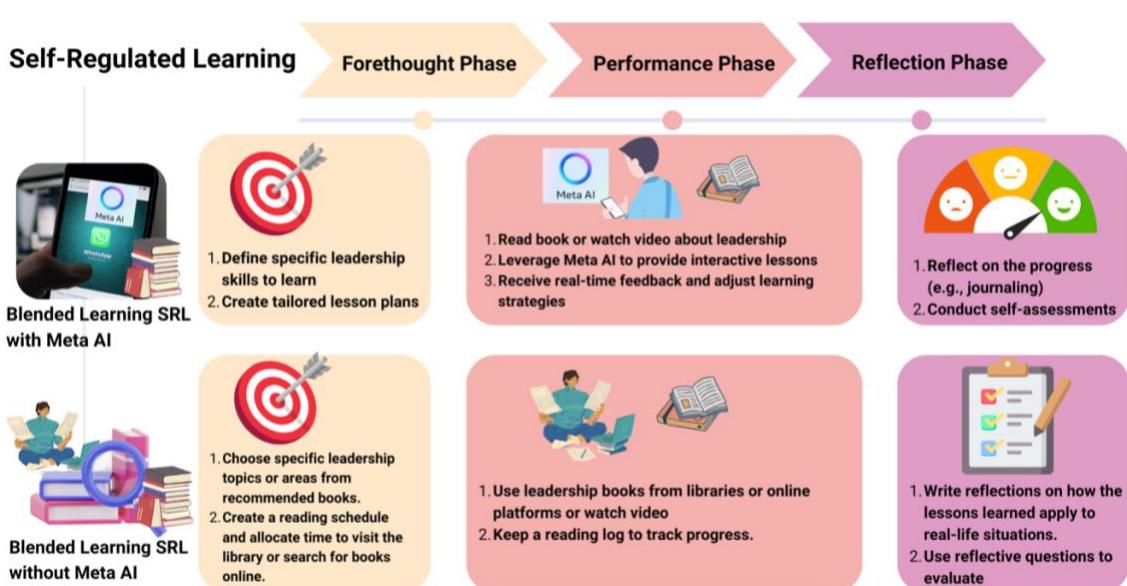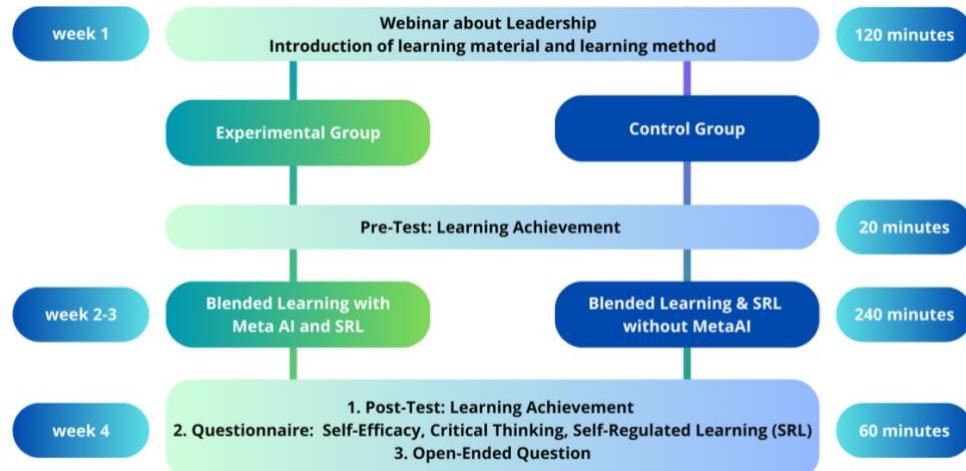
Figure 3. Screenshot of learning with Meta AI

4. Results

4.1 Learning Achievement

Table 1. *Wilcoxon Test for learning achievement*

Group	Variance	N	Mean	SD	Z	α
Blended Learning Meta AI-SRL (BMAI-SRL)	Pre Test	9	10.0	8.6	2.687	0.007**
	Post Test	9	74.4	12.3		
Blended Learning SRL without Meta AI (B-SRL)	Pre Test	9	10.0	7.07	2.692	0.007**
	Post Test	9	73.3	10		

**p-value <0.01

Table 2. *Mann-Whitney U Test for gain score of learning achievement*

Variance	N	Mean Rank	Sum of Ranks	U	Z	α
BMAI-SRL	9	9.83	88.50	37.500	-0.277	0.782
B-SRL	9	9.17	82.50			

p-value > 0.05

Table 1 shows significant improvements in both the BMAI-SRL and B-SRL groups from pre-test to post-test. As seen in Table 2, the gain scores between groups were not significantly different suggesting both methods were equally effective in this pilot study.

4.2 Critical-Thinking, Self-Efficacy, and Self-Regulated Learning

Table 3. *Mann-Whitney U Test for Critical Thinking*

Variance	N	Mean Rank	Sum of Ranks	U	Z	α
BMAI-SRL	9	9.83	88.50	37.500	-0.268	0.789
B-SRL	9	9.17	82.50			

p-value > 0.05

Table 3 indicates no significant difference in critical thinking. Both groups improved, though the B-SRL group showed slightly more consistent outcomes.

Table 4. *Mann-Whitney U Test for Self-Efficacy*

Variance	N	Mean Rank	Sum of Ranks	U	Z	α
BMAI-SRL	9	7.17	64.50	19.500	-1.886	0.059
B-SRL	9	11.83	106.50			

p-value > 0.05

As shown in Table 4, the B-SRL group reported higher confidence, but the difference was not significant. This suggests both methods supported self-efficacy, with the book group showing greater stability.

Table 5. *Mann-Whitney U Test for Self-Regulated Learning (SRL)*

Item	Variance	N	Mean Rank	Sum of Ranks	U	Z	α
Goal Setting	BMAI-SRL	9	9.44	85.00	40.000	-0.046	0.963
	B-SRL	9	9.56	86.00			
Environment	BMAI-SRL	9	10.22	92.00	34.000	-0.587	0.557
	B-SRL	9	8.78	79.00			
Task Strategy	BMAI-SRL	9	9.28	83.50	38.500	-0.189	0.850
	B-SRL	9	9.72	87.50			
Time Management	BMAI-SRL	9	9.00	81.00	36.000	-0.407	0.684
	B-SRL	9	10.00	90.00			
Help Seeking	BMAI-SRL	9	8.56	77.00	32.000	-0.804	0.422
	B-SRL	9	10.44	94.00			
Self-Evaluation	BMAI-SRL	9	8.61	77.50	32.500	-0.755	0.450
	B-SRL	9	10.39	93.50			

p-value > 0.05

Table 5 shows no significant differences across SRL dimensions. Both groups engaged in SRL strategies, with the B-SRL group slightly stronger in help seeking and self-evaluation, while BMAI-SRL showed greater variability.

Table 6. *Thematic Analysis*

| Theme | Code | The number of times mentioned | |
		BMAI-SRL	B-SRL
Depth of Understanding and Value Integration	New knowledge, understanding values, simple, sacred, relevant, wide view but sometimes shallow	19	15
Emphasis on Interaction and Shared Experience	Discussion, teamwork, teacher's encouragement, Master Solid	9	10
Learning Challenges	Difficulty understanding, time management, applying theory, laziness, unstable network, AI validity, distractions,	14	12
Desire for Practical Application and Real-World Relevance	Practical approach, tech/media, case studies, direct practice, less boring, desire for practice, real-world visits, human interaction.	11	9
Relevance and Motivation	Relevant (pesantren), team, self-leadership, self-will, culturally meaningful, personally motivating	16	14
Application and Confidence	Apply in teaching, moral/ethics, care/support, build solid team, applying learning, responsibility, growing confidence	13	13

To capture qualitative perspectives, students were asked the following open-ended reflection question. These open-ended questions aim to capture participants' impressions, challenges, understanding, motivation, and the overall impact of learning leadership based on local wisdom on their cultural relevance, engagement, and leadership development. Thematic analysis revealed that both groups shared similar experiences. Depth of understanding and value integration appeared most often (BMAI-SRL = 19, B-SRL = 15), followed by relevance and motivation (16, 14). Common themes also included learning challenges (14, 12) and the desire for practical application (11, 9). Both groups equally highlighted application and confidence (13, 13), indicating that learners valued putting knowledge into practice and building self-assurance regardless of medium.

5. Discussion

This exploratory pilot study found that both the Meta AI–supported blended learning (BMAI-SRL) and traditional book-based blended learning (B-SRL) significantly improved leadership knowledge, critical thinking, self-efficacy, and self-regulated learning, with no statistically significant differences between groups—suggesting that combining SRL with either digital or traditional modalities supports short-term learning gains in leadership education (Zimmerman, 2000; Weng et al., 2024; Hwang et al., 2024). The BMAI-SRL group valued efficiency, personalization, and flexibility, though they also faced challenges related to AI reliability and distraction, aligning with concerns about the need for robust scaffolding in AI-mediated learning environments (Moya & Camacho, 2024; Fullan et al., 2024). Conversely, the B-SRL condition offered deeper cultural grounding and more consistent engagement, in line with literature emphasizing the importance of embedding local wisdom and cultural narratives in leadership development (Andriyanti et al., 2024; Effendi et al., 2020). However, the study's generalizability is constrained by its small sample size, short intervention duration, and reliance on self-reported measures, while the imbalance in social and instructional support across groups introduces a design confound that needs attention. Future research should address these limitations by recruiting larger and more diverse samples, implementing longer-term and longitudinal designs, balancing collaborative and AI-guided learning structures, and incorporating objective performance measures alongside qualitative reflections. Despite these caveats, the results underscore the promise of a blended instructional model that harmonizes AI-driven adaptability with culturally embedded reflective materials in nurturing context-sensitive, adaptive leadership learning.

6. Conclusion

This study concludes that both BMAI-SRL and B-SRL, when supported by blended learning and self-regulated learning, significantly enhanced leadership knowledge with no major

differences in critical thinking, self-efficacy, or SRL outcomes. While BMAI-SRL offered flexibility and personalization but faced issues of reliability and distraction, whereas B-SRL provided cultural grounding and consistency engagement. Given the study's small sample size, short duration, and reliance on self-reported data, future research should adopt larger, more diverse samples, longer-term designs, and objective performance measures to validate and extend these findings. Overall, the integration of AI-driven adaptability with culturally embedded reflective learning holds promise for developing context-sensitive leadership education.

7. Acknowledgment

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