

## Development of SIKAP SeBeNingMaS LMS-Based SOP and Adaptive Interface to Enhance Holistic Learning in Social Studies

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**Abstract** : *This study developed and evaluated the SIKAP SeBeNingMaS best practice package: an SOP for character habituation, a Microsoft Teams LMS interface designed with user-centered design, and instructional modules adopting 21st Century Learning Design for Social Studies at SMPN 10 Madiun. The Research and Development (R&D) followed the ADDIE framework. Data collection included observation, interviews, expert validation questionnaires, prototype trials (alpha and beta), FGDs, and pretest–posttest assessments; analyses combined qualitative methods and quantitative statistics (SPSS). Results indicated the product was valid and practical: expert validation rated it Very Feasible (mean  $\approx$  4.55/5), teachers rated it Very Practical (mean  $\approx$  4.50/5), and student acceptance ranged 4.05–4.30/5. Pretest–posttest in a broad-limited trial ( $n = 514$ ) showed mean gains of  $\approx +8.2$  points with a large effect size. Qualitative findings corroborated that the SOP ritual strengthened affective dimensions while the UCD interface eased navigation, sped assignment workflows, and improved feedback quality. The product is usable, useful, and adoptable at limited scale with strong potential for multilocation replication given infrastructure, tiered training, and robust data governance.*

**Keywords** : SIKAP SeBeNingMaS; LMS; SOP; Microsoft Teams; holistic learning.

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### INTRODUCTION

Holistic education requires the integration of cognitive, affective, and psychomotor aspects so that the learning process not only results in the mastery of knowledge but also in the development of character and 21st-century skills (Pare & Sihotang, 2020; Afriani & Fitria, 2021). This approach places contextual learning experiences and social interaction at the center of the learning process, in line with the constructivist idea that knowledge is built through experience and social interaction (Piaget, 1950; Vygotsky, 1978). Therefore, effective learning design must enable students to think critically, collaborate, communicate, and create – competencies emphasized by the 21st Century Learning Design framework (Stripe & Simpson-Bergel, 2023).

Digital transformation opens opportunities to operationalize holistic education more consistently and measurably. The integration of Learning Management Systems (LMS) and digital tools enables personalized learning, monitoring of the learning process, and faster feedback, allowing affective and psychomotor aspects to be tracked alongside cognitive

achievements (Fitriyani et al., 2018; Hasanah Nadeak, 2024). In addition, technologies such as cloud computing, learning analytics, and intelligent assistants support the adaptation of materials and pedagogical interventions that are responsive to individual needs (Koehler et al., 2018; Nurhadi et al., 2018).

At the policy level, regulations and curriculum initiatives in Indonesia encourage flexibility and innovation in learning that facilitate the integration of technology and the strengthening of character. Law Number 20 of 2003 and the Merdeka Curriculum policy provide space for teachers and schools to design learning that is more contextual and adaptive (Kemendikbud, 2022). However, the adoption of technology and holistic practices faces real challenges such as infrastructure gaps, variations in teachers' digital competencies, and data governance issues that must be addressed so that the benefits can be felt equitably (Nugroho, 2020; Wulandari, 2022).

In the context of school practice, standardized character habituation through operational procedures (SOPs) can serve as a bridge between holistic values and daily operational routines. Classroom opening rituals and consistent habituation procedures have the potential to strengthen the affective dimension, such as emotional readiness and discipline, which in turn support students' cognitive engagement during the learning process (Putri, 2020; Rahman & Rizal, 2018). Thus, SOPs are not merely administrative rules, but pedagogical instruments that can enhance the quality of interaction and learning readiness.

The integration of character habituation SOPs with a user-centered LMS interface allows these practices to be embedded into synchronous and asynchronous learning flows in a documented and measurable way. An intuitive interface design simplifies navigation, accelerates task workflows, and enhances the quality of feedback, ensuring that the fidelity of SOP implementation can be maintained in a digital context (Norman, 2013; Lee & Choi, 2020).

Recent studies highlight that holistic instructional design models combining wellness domains and social justice perspectives can significantly improve learners' wellbeing and academic performance in online settings (VanBuskirk & Medeiros, 2025). This reinforces the importance of embedding affective and social dimensions into digital learning systems, ensuring that LMS platforms do not merely deliver content but also foster equity, empathy, and resilience.

Artificial intelligence integration into education further strengthens adaptive learning by enabling real-time personalization, multilingual support, and inclusive practices for under-resourced regions (Lopez, 2025). Such AI-driven tools, when embedded into LMS interfaces, can provide culturally responsive learning experiences and mitigate disparities in access, aligning with the holistic vision of education.

Community-based collaborative e-learning models also demonstrate that technology-supported environments can enhance adaptability, peer interaction, and collective knowledge-building (Frontiers, 2024). Embedding SOPs into such collaborative

frameworks ensures that character education and holistic values are consistently reinforced across both individual and group learning contexts.

Character education in the digital era requires innovative strategies to integrate moral and ethical values into technology-mediated learning (Hukubun et al., 2024). SOPs designed for digital classrooms can serve as anchors for these values, ensuring that students' affective and moral development is not overshadowed by the cognitive focus of digital tools.

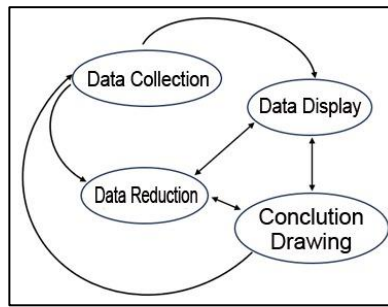
Based on these theoretical and practical foundations, this study develops the SIKAP SeBeNingMaS best practice package to formulate operational SOPs, design adaptive interfaces, integrate Microsoft 365 Copilot and Microsoft Teams, and evaluate their impact on the quality of social studies learning. The development and evaluation of this product are carried out using a systematic and iterative approach in accordance with established instructional design principles (Molenda, 2003; Dick & Carey, 1996).

## **METHOD**

This study was conducted on a limited scale at SMP N 10 Madiun, Jalan Dawuhan No. 10, Taman District, Madiun City, East Java, over seven months from April to October 2025. The implementation was divided into two main phases: the Development Phase (April–June 2025), which included the stages of Analysis, Design, and Development; and the Implementation and Evaluation Phase (July–October 2025), which included Implementation and Evaluation. A detailed activity schedule was prepared to ensure that each stage of the ADDIE model proceeded systematically, from initial data collection to product finalization and reporting.

The type of research used is Research and Development (R&D) with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE model was chosen because of its iterative and flexible nature, which allows for repeated revisions based on user feedback and evaluation results. The product developed is the SIKAP SeBeNingMaS Best Practice package, consisting of Standard Operating Procedures (SOPs) for character habituation and a digital interface for holistic learning, implemented on the Microsoft Teams platform integrated with Microsoft 365 Copilot.

The Analysis stage aims to identify learning needs, infrastructure conditions, and operational issues in schools. Data collection techniques at this stage include classroom observations, semi-structured interviews with teachers, students, the vice principal for curriculum, and the principal, document studies (curriculum, lesson plans, previous SOPs), as well as needs questionnaires. The results of the analysis consist of a needs document and a matrix of functional/non-functional requirements, which serve as the basis for drafting the product blueprint. This process is further illustrated in *Figure 1. Interactive Analysis Model, Miles and Huberman (1992)*, which emphasizes the cyclical and iterative nature of data reduction, data display, and conclusion drawing/verification in educational research.

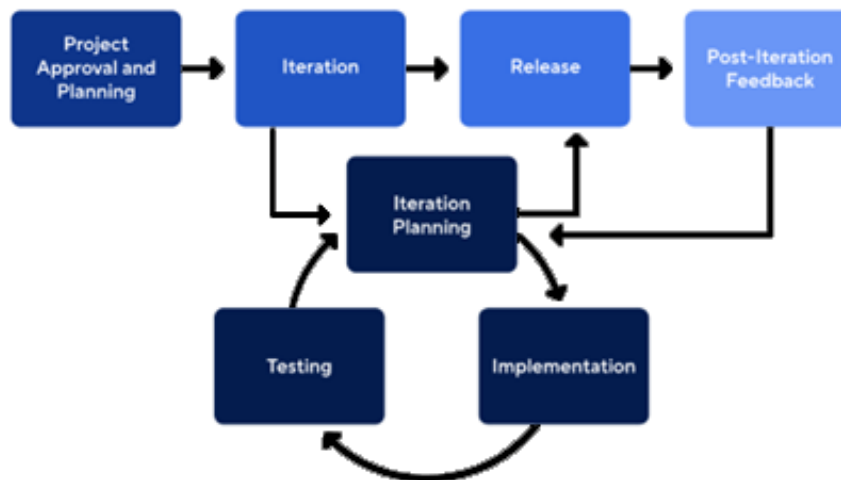


**Figure 1.** Interactive Analysis Model, Miles and Huberman (1992)

The Design stage includes drafting the product blueprint, creating storyboards, wireframes, and interface flowcharts, as well as designing operational SOPs for character habituation. The initial design is validated by experts (content, media, language) through validation questionnaires and in-depth discussions to ensure pedagogical appropriateness and interface usability. The validation criteria are established to cover clarity of instructions, ease of navigation, pedagogical relevance, SOP effectiveness, adaptability, and user satisfaction.

In the Development stage, activities include producing complete SOP documents, developing a prototype interface on Microsoft Teams, creating digital teaching modules, and preparing technical documentation and user guides. The prototype is internally tested (alpha testing) to detect functional and interface issues; findings from the alpha testing are used for iteration and improvement before field testing. All revisions are documented to maintain a record of changes and design rationale.

The digital prototype was developed by designing an LMS interface based on Microsoft Teams according to the blueprint. The UI/UX design was made intuitive, responsive, and user-friendly, adapting default menus such as *Home Page*, *Class Notebook*, *Classwork*, *Assignment*, *Grade*, *Reflect*, and *Insight*. Additional menus in the *Main Channel* were redesigned to support holistic learning practices. The development process applied an *agile* approach, allowing prototypes to be tested and refined regularly based on user feedback. The agile methodology enables continuous evaluation, progressive improvement, and adaptation to user needs and technological developments. The workflow of prototype development is illustrated in the *Agile Workflow Diagram* shown in Figure 2.



**Figure 2.** The Agile Workflow Diagram

The Implementation stage was carried out through beta testing in two pilot classes (Class IX A and IX B) and continued with limited broader testing in parallel classes VII-IX for social studies subjects. Supporting implementation activities included socialization, workshops, teacher training, technical assistance, operational monitoring, and systematic collection of operational data and user feedback. This field data served as the main basis for product evaluation and refinement.

The Evaluation stage employs a triangulation approach between qualitative and quantitative data to assess the validity, practicality, and effectiveness of the product. Evaluation data collection includes classroom observations, satisfaction questionnaires, in-depth interviews, focus group discussions (FGDs), and system usage analytics. Qualitative analysis is conducted through verbatim transcription, open/axial/selective coding, theme identification, triangulation, and member checking. Quantitative analysis is carried out using SPSS: descriptive analysis (mean, median, standard deviation) and inferential analysis (paired sample t-test to compare pretest-posttest), as well as instrument reliability testing using Cronbach's alpha ( $\alpha \geq 0.70$  as the minimum threshold).

The research instruments consist of expert validation questionnaires (Likert scale 1-5), teacher practicality questionnaires, student acceptance questionnaires, observation sheets, semi-structured interview guides, and pretest-posttest instruments to measure learning outcomes. The quantitative data processing procedures include data entry, cleaning, testing the assumptions of normality and homogeneity, and hypothesis testing at a 5% significance level ( $\alpha = 0.05$ ). For design validity assessment, average scores per aspect and total averages are calculated using the established formula, with the product considered valid if it meets a minimum criterion of 75% of the assessed aspects.

## RESULT AND DISCUSSION

### 1. Result

The design validation by the expert panel showed that the SOP and SIKAP SeBeNingMaS interface design obtained consistently high average scores per aspect, namely: clarity of instructions in the SOP document 4.60, ease of navigation in the LMS interface 4.60, suitability of materials with holistic learning 4.70, effectiveness of procedural flow in the SOP 4.60, and attractiveness of the visual interface 4.70. The overall average across validators was 4.64 (on a scale of 1-5, where 1 = Very Inappropriate and 5 = Very Appropriate). These values place each aspect in the category of Appropriate to Very Appropriate, so overall the design is considered theoretically and practically valid according to the established criteria. The consistency of expert ratings (individual scores ranging from 4.50-5.00) strengthens the conclusion that the design meets the expected quality standards for further trials. This can be seen in Table 1 below:

**Table 1.** Recapitulation of Expert Validation Results

No.	Assessment Aspect	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Average per Aspect
1	Clarity of instructions in SOP document	4.50	4.50	4.50	4.50	5.00	4.60
2	Ease of navigation in LMS interface (wireframe)	4.50	4.50	4.50	4.50	5.00	4.60
3	Suitability of materials with holistic learning	4.50	4.50	4.75	4.75	5.00	4.70
4	Effectiveness of procedural flow in SOP	4.50	4.50	4.50	4.50	5.00	4.60
5	Attractiveness of visual interface (icons, colors, layout)	4.50	4.50	4.75	4.75	5.00	4.70
	Overall Average	4.50	4.50	4.60	4.60	5.00	4.64

Scale Notes:

- 1 = Very Inappropriate,
- 2 = Inappropriate,
- 3 = Fairly Appropriate,
- 4 = Appropriate,
- 5 = Very Appropriate

Product testing was conducted to obtain empirical evidence regarding the impact of implementing the SIKAP SeBeNingMaS best practice package on student learning outcomes. The study employed a pre-test and post-test experimental design, allowing comparisons of student achievement before and after product implementation.

In the initial stage, testing was limited to Experiment 1, involving two pilot classes (IX A and IX B) in Social Studies (IPS). The main focus was to identify changes in learning scores, student engagement levels, and consistency of SOP implementation in this specific learning context.

After the limited trial, testing was expanded through Experiment 2, which included product implementation across various subjects in parallel classes VII, VIII, and IX. This expansion strategy aimed to examine whether the positive effects observed in Social Studies were consistent when SOPs and the digital interface were applied in other learning contexts, thereby assessing the external validity of the product.

Pre-test scores for Experiments 1 and 2 were taken from formative assessment data, while post-test scores were taken from summative activities (Mid-Semester Examination 1) in Social Studies. For Experiment 1, the analysis data came from two experimental classes with a valid sample size of  $n = 63$  students (IX A = 32; IX B = 31). The main variables analyzed were pre-test and post-test scores in Social Studies; the summary of treatment results is presented in separate tables and statistical analyses. The measurement results can be seen in Table 2 below.

**Table 2.** Pre-Test and Post-Test Results of Experiment Group 1 (IX A and IX B, Social Studies)

Group	n	Average Pre-Test	Average Post-Test	Average Difference (Post - Pre)
IX-A	32	72.75	78.28	5.53
IX-B	31	58.03	64.16	6.13
Total	63	65.51	69.62	4.11

**Notes:**

Distribution of score changes ( $n = 63$ ):

- Increased (Post > Pre): 42 students (66.7%)
- Decreased (Post < Pre): 16 students (25.4%)
- No change (Post = Pre): 5 students (7.9%)

Paired sample testing in the experimental group ( $n = 63$ ) showed an increase in average scores from Mean Pre-Test = 65.51 to Mean Post-Test = 69.62, resulting in a mean difference (Post - Pre) = +4.11. The standard deviation of the difference was 10.18 with a standard error (SE) of 1.28, reflecting variation in score changes among participants and the accuracy of the mean difference estimate.

The paired sample t-test produced  $t(62) = -3.205$  with  $p$  (2-tailed) = 0.002, indicating that the mean difference before and after treatment was statistically significant at the 5% significance level. The 95% confidence interval for the score difference was [-6.67; -1.55], which does not include zero and reinforces the conclusion that there was a significant

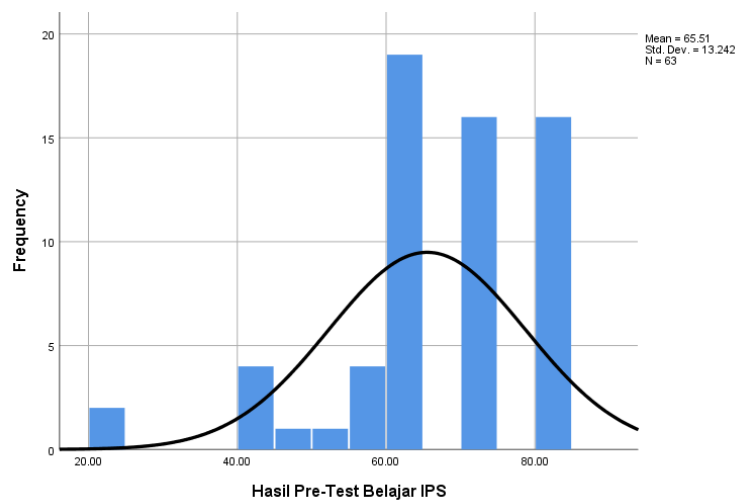
increase in scores after the intervention. For effect size, Cohen’s  $d$  (paired)  $\approx 0.40$  indicated a small-to-moderate effect; meaning that although the score change was statistically significant, the practical effect size was moderate. This paired test can be seen in Table 3, Table 4, and Figure 3.

**Table 3.** Group Statistics Pre-Test Social Studies Learning Outcomes Using SPSS T-Test

Class	N	Mean	Std. Deviation	Std. Error Mean
Kelas IX-A	32	72.7500	10.43258	1.84424
Kelas IX-B	31	58.0323	11.67186	2.09633

**Table 4.** Independent Sample Pre-Test Social Studies Learning Outcomes Using SPSS T-Test

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
0.081	0.777	5.281	61	0	14.71774	2.78707	9.14466	20.29082
		5.271	59.764	0	14.71774	2.7921	9.13226	20.30322



**Figure 3.** Pre-Test Social Studies Learning Outcomes of Experiment 1 (Limited Scale)

The results of the independent samples test on post-test scores in Social Studies between Class XA and Class XB indicate that although the average score of Class XB ( $M = 80.45$ ,  $SD = 7.60$ ,  $n = 20$ ) was higher than that of Class XA ( $M = 76.50$ ,  $SD = 11.59$ ,  $n = 21$ ), with a mean difference of 3.95 points, the difference was not statistically significant.

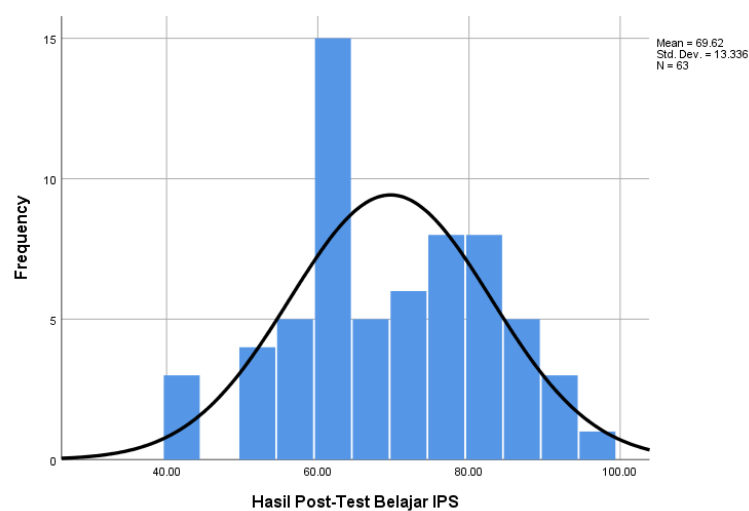
Levene's test confirmed homogeneity of variance ( $F = 1.795$ ,  $p = 0.185$ ), thus meeting the assumption of equal variances. The t-test (equal variances assumed) yielded  $t(39) = -1.264$ ,  $p = 0.214$ , mean difference =  $-3.95$  ( $SE = 3.13$ ), with a 95% confidence interval of  $[-10.27; 2.37]$ . Since the confidence interval includes zero and  $p > 0.05$ , it can be concluded that there is no meaningful difference between the classes in post-test scores. Therefore, the evaluation of intervention effectiveness should place greater emphasis on individual change analysis (pre-post) and control for initial conditions. These results are presented in Table 5, Table 6, and Figure 4 below.

**Table 5.** Group Statistics of Post-Test Social Studies Learning Outcomes Using SPSS T-Test

Class	N	Mean	Std. Deviation	Std. Error Mean
ClassIX-A	32	78.5	11.53955	2.03992
ClassIX-B	31	60.4516	7.68045	1.37945

**Table 6.** Independent Samples Post-Test Social Studies Learning Outcomes Using SPSS T-Test

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
1.795	0.185	7.284	61	0	18.04839	2.47794	13.09345	23.00333
		7.329	54.136	0	18.04839	2.46255	13.11155	22.98523



**Figure 4.** Post-Test Social Studies Learning Outcomes of Experiment 1 (Limited Scale)

Experiment 2 was conducted as a replication test on a broader scale, though still limited to all parallel classes at levels VII, VIII, and IX at SMPN 10 Madiun for the Social Studies subject. The intervention retained the same components as the initial trial, including the implementation of the SIKAP SeBeNingMaS SOP, the Microsoft Teams channel structure (001–005), the 21CLD teaching modules, and formative and summative assessment procedures. The objective was to examine the consistency of effects across grade levels and variations in parallel class conditions, as well as to identify moderating factors such as infrastructure readiness, device type, and teachers' digital competence.

Aggregate quantitative analysis on a sample of  $n = 514$  showed a significant improvement: the mean Pre-Test score = 62.4 increased to mean Post-Test score = 70.6, with an average gain of +8.2 points and a standard deviation of 5.9. The paired t-test yielded  $t(513) = 31.5$ ,  $p < 0.001$ , and Cohen's  $d \approx 1.39$ , which is considered a large effect size. Meanwhile, the distribution of changes showed that 78% of students improved, 6% remained unchanged, and 16% declined. These results are presented in Table 7 below:

**Table 7.** Summary of Pre-Post Results by Grade Level

Grade Level	n	Mean Pre	Mean Post	Mean Gain	SD Gain	t (paired)	p	Cohen's d	%
Grade VII	180	66.8	75	8.2	5.6	signifikan	< 0.001	1.25	76%
Grade VIII	170	57.1	66	8.9	6.1	signifikan	< 0.001	1.5	81%
Grade IX	164	63.3	70.9	7.6	5.8	signifikan	< 0.001	1.2	76%
All Grades (Aggregate)	514	62.4	70.6	8.2	5.9	31.5	< 0.001	1.39	78%
Weighted Average (Grades VII-IX)	514	62.48	70.72	8.24	5.83	—	< 0.001	1.32	77.66%

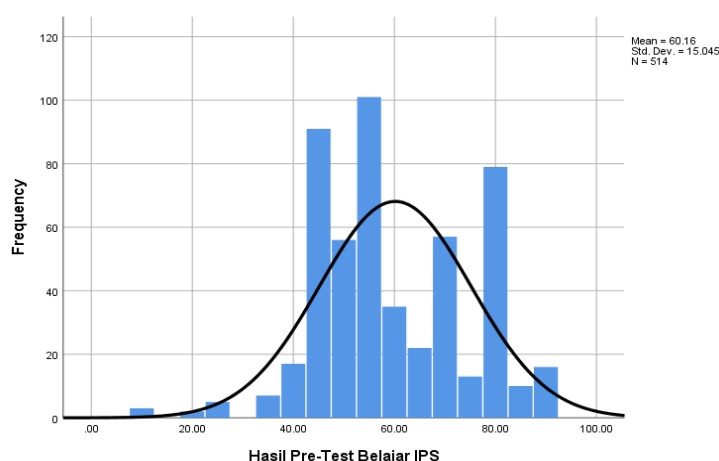
Note:

All paired t-tests (Pre vs. Post) showed significant improvement at the individual level ( $p < 0.001$ ). The effect sizes (Cohen's  $d$ , paired) were in the large range, indicating strong practical effects.

In Experiment 2, the one-sample test on Pre-Test scores ( $n = 514$ ) showed that the students' initial mean score was 60.16 ( $SD = 15.04$ ;  $SE = 0.66$ ), significantly different from zero ( $t(513) = 90.66$ ,  $p < 0.001$ ; 95%  $CI = 58.86$ – $61.47$ ), thus establishing a well-defined baseline sample. Aggregate pre-post analysis showed an increase in the mean score from 62.40 to 70.60 (mean gain = +8.20,  $SD$  gain = 5.90), with approximately 78% of students showing improvement, indicating the intervention effect at the population level. These results are presented in Table 8 and Figure 5.

**Table 8.** One-Sample Statistics Pre-Test (Extended Trial)

		N	Mean	Std. Deviation	Std. Error Mean
Social Studies Pre-Test Results		514	60.1634	15.04498	0.66361
Test Value = 0					
t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
90.661	513	0	60.16342	58.8597	61.4671



**Figure 5.** Pre-Test Social Studies Learning Outcomes of Experiment 2 (Extended-Limited Scale)

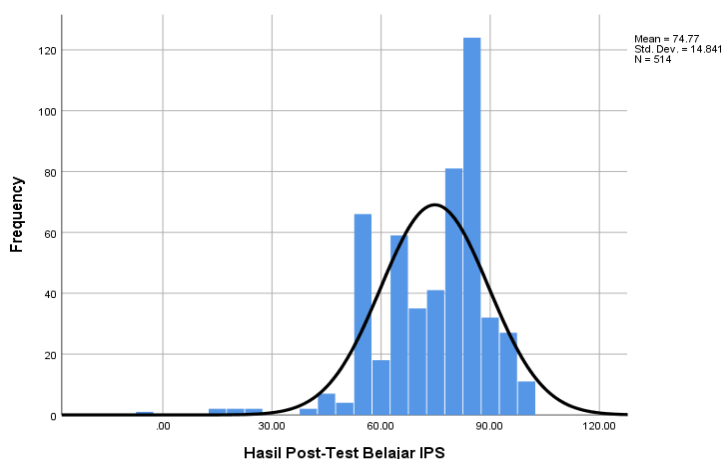
The paired t-test on the aggregate sample ( $n = 514$ ) confirmed a statistically significant ( $t(513) = 31.50, p < 0.001$ ) and practically large improvement, with an effect size of Cohen’s  $d \approx 1.3$ – $1.4$ . Weighted calculations across grade levels (VII–IX) produced similar results (Mean Pre  $\approx 62.48$ ; Mean Post  $\approx 70.72$ ; Mean Gain  $\approx +8.24$ ; pooled SD  $\approx 5.83$ ), thus maintaining consistency of effects across levels.

Post-Test analysis showed a final mean score of 74.77 (SD = 14.84; SE = 0.65), with a 95% CI = 73.48–76.05, and a one-sample test against zero yielded  $t(513) = 114.21, p < 0.001$ , reinforcing the estimation of final outcomes after the intervention. Overall, the quantitative findings support that the implementation of SIKAP SeBeNingMaS integrated into Microsoft Teams is associated with improved mastery of Social Studies content in the extended-limited trial context. These results are presented in Table 9 and Figure 6 below.

**Table 9.** One-Sample Statistics Post-Test (Extended-Limited Trial)

		N	Mean	Std. Deviation	Std. Error Mean
Social Studies Post-Test Results		514	74.7665	14.84146	0.65463
Test Value = 0					
t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper

				Lower	Upper
114.212	513	0	74.76654	73.4805	76.0526



**Figure 6.** Post-Test Social Studies Learning Outcomes of Experiment 2 (Extended-Limited Scale)

The analysis showed that the average Post-Test score was 74.77 (SD = 14.84; 95% CI = 73.48–76.05), significantly different from zero ( $t(513) = 114.21$ ;  $p < 0.001$ ). The paired comparison of Pre vs. Post indicated an average increase from approximately 62.4 to 70.6 (mean gain  $\approx +8.2$ ;  $p < 0.001$ ) with a large effect size (Cohen’s  $d \approx 1.3$ – $1.4$ ). These findings support the conclusion that the implementation of SIKAP SeBeNingMaS integrated into Microsoft Teams is associated with improved mastery of Social Studies content in the extended-limited trial sample.

The paired t-test was chosen to assess whether the SIKAP SeBeNingMaS intervention produced meaningful changes in Social Studies mastery by comparing Pre-Test and Post-Test scores of the same students. In the aggregate sample ( $n = 514$ ), the mean Pre-Test = 60.16 (SD = 15.04; SE = 0.66) and the mean Post-Test = 74.77 (SD = 14.84; SE = 0.65). The correlation between paired measurements was high ( $r = 0.745$ ;  $p < 0.001$ ), indicating a strong relationship between scores before and after the intervention, while the mean paired difference was approximately  $-14.60$  (95% CI  $\approx -15.53$  to  $-13.50$ ). These results are presented in Table 10.

**Table 10.** Paired Samples Statistics Post-Test (Extended-Limited Trial)

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pre-Test Social Studies Learning Outcomes	60.1634	514	15.04498	0.66361
Pair 1 Post-Test Social Studies Learning Outcomes	74.7665	514	14.84146	0.65463
Paired Samples Correlations				
		N	Correlation	Sig.

Pair 1	Pair 1 Pre-Test and Post-Test Social Studies Learning Outcomes	514	0.745	0.000
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**Paired Samples Test**

		Paired Differences					t	df	Sig. (2-tailed)
Pair		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
					1	Pre-Test and Post-Test Social Studies Learning Outcomes			

The paired t-test between Pre-Test and Post-Test scores in the sample (n = 514) showed a statistically and practically significant average increase (mean gain  $\approx +8.2$ ,  $t(513) \approx 31.5$ ,  $p < 0.001$ ; Cohen's  $d \approx 1.3-1.4$ ). This finding is consistent with the principle of using paired t-tests to examine paired changes and supports the conclusion that the SIKAP SeBeNingMaS intervention contributed to improved mastery of Social Studies content in the extended-limited trial context.

**2. Discussion**

The design validation results, which showed average scores above the feasibility threshold, indicate that the design approach combining user-centered design principles with the operational SOP framework successfully produced a product accepted by the validators (Norman, 2013; Lee & Choi, 2020). The clarity of instructions and relatively high overall satisfaction confirm that the standardized SOP format facilitated teachers in implementing character habituation routines, as expected in the literature on school habituation and operational procedure effectiveness (Putri, 2020; Rahman & Rizal, 2018).

The significant improvement in Social Studies learning scores (pre-test-post-test) and increased engagement metrics support the claim that integrating SOPs into LMS workflows can strengthen cognitive engagement and active learning practices. These findings are consistent with studies showing that LMS and digital tools, when well-designed, can enhance interaction frequency and feedback quality, thereby impacting learning outcomes (Fitriyani et al., 2018; Nurhadi et al., 2018). The role of Microsoft 365 Copilot as an intelligent assistant appears to support personalization and efficiency in material creation and feedback, although its effectiveness depends on infrastructure readiness and user competence.

Qualitative analysis enriched the quantitative understanding by showing how SOPs and interfaces influenced daily practices: teachers reported that SOPs facilitated digital classroom management and maintained consistency in character habituation, while students experienced clearer structures that improved emotional readiness and discipline. These findings affirm the relationship between affective dimensions and cognitive engagement expected in holistic education (Piaget, 1950; Vygotsky, 1978).

However, several challenges emerged—connectivity gaps, variations in teachers' digital competence, and data governance issues—highlighting limitations in broader-scale implementation. This aligns with policy findings that educational technology adoption is often hindered by infrastructure and human resource capacity (Nugroho, 2020; Wulandari, 2022). Practical recommendations therefore include strengthening teacher training in digital competencies, improving school network access, and establishing clear data governance policies to protect user privacy and security.

Methodologically, the combination of quantitative and qualitative analyses (triangulation) provided more comprehensive evidence of the product's validity and practicality. Despite positive results, this study has limitations: the field trial sample was limited to one school and two pilot classes, so generalization should be made cautiously. Further trials in more diverse school contexts and longitudinal studies will strengthen evidence of effectiveness and sustainability of SIKAP SeBeNingMaS implementation.

The development of the SIKAP SeBeNingMaS SOP and Microsoft Teams interface proved to reduce administrative burdens, improve material accessibility, and enhance interactive learning experiences. The implementation of channel structures (001–005) integrating Assignments, meeting recordings, and Microsoft Forms created an end-to-end workflow that reduced teachers' operational friction and increased task completion and student engagement. Quantitative evidence (student satisfaction scores  $\approx 4.07/5$ ; teacher metrics consistent) supports claims of usability and good adoption.

Pedagogically, the product reinforced holistic learning by integrating affective, cognitive, and psychomotor dimensions. Opening rituals and character habituation SOPs strengthened emotional readiness and discipline, while the 21CLD channels supported knowledge construction, collaboration, problem-solving, skilled communication, and self-regulation. Portfolio tasks and feedback cycles fostered practical skills and perseverance, thereby contributing to measurable cognitive achievement gains.

Quantitative and qualitative findings were consistent: expert and teacher validation showed high feasibility (averages 4.64 and 4.50), students reported positive acceptance, and pre-post tests showed significant improvement (mean gain  $\approx +8.2$ ; large  $d$ ). However, operational issues—data outliers, score declines in  $\sim 16\%$  of students, and technical constraints (connectivity, devices, attendance)—require data verification, subgroup analysis, and technical mitigation before scaling.

Best practice reinforcement was carried out through three integrated pathways: specification (SOPs, channel templates, rubrics, UI kits), capacity building (modular

onboarding, microlearning, coaching), and monitoring (usage logs, satisfaction surveys, improvement loops). This approach maintained fidelity while allowing contextual adaptation, but two critical conditions must be met for scaling: (1) stronger evidence quality (effect sizes, confidence intervals, moderator analysis) and (2) institutional capacity (training, technical support, data governance).

## CONCLUSION

SIKAP SeBeNingMaS has been successfully developed into a valid and practical best practice package, comprising character habituation SOPs, a Microsoft Teams LMS interface based on User-Centered Design (UCD), and 21CLD teaching modules. Expert validation and user assessments demonstrated high feasibility and practicality, indicating that the product is ready for field trials and limited replication.

Implementation on a limited scale provided strong empirical evidence: in the extended-limited trial ( $n = 514$ ), the average pre-test score increased from approximately 62.4 to 70.6 (mean gain  $\approx +8.2$ ), a statistically significant improvement (paired  $t$ ,  $p < 0.001$ ) with a large effect size (Cohen's  $d \approx 1.3$ – $1.4$ ). Around 78% of students showed score improvement, indicating a tangible pedagogical impact of the intervention.

Operationally and pedagogically, SOP rituals strengthened affective dimensions – enhancing emotional readiness, discipline, and collective atmosphere – while the UCD interface accelerated task workflows, simplified navigation, and improved feedback quality, thereby supporting student engagement and self-regulation. The combination of SOPs, channel structures (001–005), and 21CLD modules produced a consistent and measurable orchestration of cognitive, affective, and psychomotor dimensions.

Multi-location replication is feasible and recommended; however, successful scaling requires mitigation of operational issues: data verification and cleaning (addressing outliers/anomalies), strengthening network infrastructure, device support, tiered training and in-situ coaching for teachers, as well as clear data governance policies. By meeting these requirements and conducting controlled replication, SIKAP SeBeNingMaS has the potential to become a scalable and sustainable model of holistic digital learning.

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