

DEVELOPING AND VALIDATING A SMART-BASED WRITING MATERIALS FRAMEWORK FOR PRE-SERVICE EFL TEACHERS

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ABSTRACT

Writing competence remains a critical yet challenging component of EFL teacher education, particularly in enabling pre-service teachers to design scaffolded, measurable, and genre-sensitive instructional objectives. Although the SMART framework (Specific, Measurable, Achievable, Relevant, and Time-bound) has been widely adopted in instructional planning, its systematic application and validation within writing pedagogy remain limited. Addressing this gap, the present study aimed to develop and validate a SMART-based instructional framework refined through the iterative Successive Approximation Model (SAM). Adopting a mixed-methods research and development (R&D) design, the study followed successive phases of preparation, design, development, implementation, and evaluation. The framework was validated by expert reviewers in language, material, and media, and subsequently trialed with fifth- and seventh-semester pre-service EFL teachers. Quantitative data were collected through validation instruments and competence assessments, while qualitative data were obtained from participant feedback, instructional artifacts, and reflective responses. Descriptive and inferential analyses indicated that the framework demonstrated strong content validity and instructional relevance, although aspects of practicality required further refinement. The iterative nature of SAM facilitated continuous improvement based on expert and user feedback, resulting in a more responsive and learner-centered design. The findings suggest that the SMART-based framework effectively enhances pre-service teachers' competence in formulating instructional objectives for writing and functions as both a developmental and diagnostic tool in teacher education. This study contributes a praxis-oriented instructional framework that bridges theoretical rigor and classroom applicability, with implications for curriculum integration, genre-based scaffolding, and future development of technology-enhanced instructional supports.

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INTRODUCTION

Writing proficiency constitutes a core competency in English as a Foreign Language (EFL) teacher education, encompassing higher-order cognitive, linguistic, and pedagogical skills essential for effective communication and instruction. Beyond grammatical accuracy and stylistic control, writing functions as a medium through which educators synthesize ideas, construct disciplinary knowledge, and model academic literacy for their learners (Cohen & Brooks-Carson, 2001). Consequently, pre-service EFL teachers are required not only to master their own writing abilities but also to develop the pedagogical competence to design instructional materials and provide constructive feedback that stimulates creativity and critical thinking (Knoch et al., 2014). Nevertheless, extensive research indicates that many prospective EFL teachers encounter persistent difficulties in translating theoretical principles of writing pedagogy into effective classroom practice (Liao, 2018).

These challenges are particularly evident in EFL contexts such as Indonesia, where writing instruction is shaped by a complex interaction of systemic, institutional, and teacher-related constraints. Empirical studies have documented teacher-related issues, including limited confidence in teaching writing, heavy reliance on traditional instructional methods, and insufficient understanding of genre-based pedagogy (Anggarini, 2022). At the systemic level, large class sizes, exam-oriented curricula, and inadequate instructional resources further restrict opportunities for innovation, individualized support, and meaningful feedback (Zhang, 2025). While these factors have been widely acknowledged, comparatively little attention has been paid to instructional design issues that underlie these pedagogical challenges, particularly teachers' difficulties in formulating clear, measurable, and scaffolded learning objectives for writing instruction (Biria & Karimi, 2015).

The absence of explicit and well-structured frameworks for instructional planning has significant pedagogical implications. Without clear guidance, pre-service teachers often produce lesson plans that lack coherence, demonstrate weak alignment between objectives, activities, and assessment, and are difficult to evaluate in terms of learning outcomes (Liu et al., 2025). Although influential instructional approaches such as Communicative Language Teaching (CLT) and Task-Based Language Teaching (TBLT) have shaped contemporary EFL pedagogy, they tend to provide limited practical direction for goal formulation in writing instruction (Daba et al., 2022). As a result, there is a pressing need for a structured and empirically grounded framework that enables teachers to articulate specific and measurable learning goals while retaining pedagogical flexibility.

One potential response to this need is the SMART framework, which emphasizes the formulation of learning objectives that are Specific, Measurable, Achievable, Relevant, and Time-bound. Originally developed within organizational psychology, SMART objectives have been successfully adapted to educational settings to enhance clarity, accountability, and learner autonomy (Mueller-Lyaskovets & Horner, 2021; Bazari, 2019). However, the application of SMART principles to writing instruction remains limited, particularly given the qualitative and creative dimensions of writing, such as voice, coherence, and rhetorical adaptability (Yacoub, 2021). This raises an important pedagogical question: how can SMART principles be contextualized for writing instruction without undermining its iterative and creative nature?

Addressing this question requires attention not only to goal formulation but also to the processes through which instructional materials are designed, tested, and refined. In this regard, the Successive Approximation Model (SAM) offers a complementary perspective by emphasizing cyclical development, rapid prototyping, and continuous improvement informed by empirical feedback (Zhang et al., 2022). Research shows that a blended approach utilizing SMART goals and adaptive frameworks similar to SAM assessments can significantly improve the educational experience (Margolis & Providência, 2021). Together, these frameworks offer

a praxis-oriented approach capable of bridging the persistent gap between instructional theory and classroom implementation in EFL writing pedagogy.

Despite growing scholarly interest in instructional design and teacher competencies, there remains a notable lack of empirical research that systematically develops and validates a SMART-based writing materials framework through an iterative SAM process. Existing studies have examined isolated aspects of writing instruction, such as teacher feedback practices (Knoch et al., 2014) and digital literacy integration (Daba et al., 2022), yet these investigations tend to be fragmented and do not culminate in a cohesive framework focused on measurable and adaptive goal-setting in teacher education. This gap underscores the need for research that moves beyond descriptive analysis toward the development and validation of an integrated instructional model.

In response to this gap, the present study seeks to formulate and empirically validate a SMART-based writing materials framework tailored for pre-service EFL teachers through the application of the Successive Approximation Model. Specifically, this research aims to: (1) examine the validity and practicality of a SMART-based framework refined via SAM; (2) identify classroom-level challenges faced by educators in its implementation; and (3) evaluate its effectiveness in enhancing teachers' competencies in designing pedagogically sound and adaptable writing materials. By synthesizing SMART and SAM into a unified instructional model, this study contributes both theoretically and practically to the advancement of writing pedagogy in EFL teacher education, offering an evidence-based framework that supports goal clarity, instructional adaptability, and sustainable professional development.

RESEARCH METHOD

Research Design

This study employed a mixed-methods Research and Development (R&D) design grounded in the Successive Approximation Model (SAM) to develop and validate a SMART-based writing materials framework for pre-service EFL teachers. SAM was selected due to its iterative, flexible nature, which allows continuous refinement through feedback and is well-suited to complex instructional design contexts in teacher education.

The R&D process consisted of three iterative phases: Preparation, Iterative Design, and Iterative Development. The Preparation phase involved a needs analysis to identify challenges in EFL writing instruction and instructional planning. In the Iterative Design phase, an initial framework prototype was developed and refined through expert validation to ensure content relevance, clarity, systematicity, and practicality. The Iterative Development phase focused on limited-scale field trials with pre-service EFL teachers to evaluate the framework's practicality and effectiveness, followed by further revisions based on empirical findings.

A convergent mixed-methods approach was adopted, in which quantitative and qualitative data were collected and analyzed in parallel. Quantitative data provided evidence of validity, reliability, and instructional effectiveness, while qualitative data offered insights into implementation processes and contextual challenges. Integration of both data strands enhanced methodological rigor through triangulation and supported a comprehensive evaluation of the developed framework.

Population and Sample

The population of this study consisted of pre-service EFL teachers and teacher educators in an English teacher education program at a higher education institution in West Nusa Tenggara, Indonesia. Using purposive sampling, three participant groups were involved. A total of 25 pre-service EFL teachers participated in the needs analysis phase, 12 lecturers contributed contextual and pedagogical input during development, and five expert validators evaluated the framework's validity and practicality. For the field trial phase, 22 pre-service EFL teachers were selected to examine the framework's practicality and effectiveness.

Instruments

Three research instruments were employed to support data collection and framework evaluation. First, an Expert Validation Questionnaire was used to assess the content relevance, clarity, systematicity, and practicality of the SMART-based framework. This instrument was reviewed by expert validators to establish content validity and ensure alignment with instructional design and EFL writing pedagogy principles. Second, a Needs Analysis Questionnaire was administered to pre-service EFL teachers to identify difficulties in instructional planning, learning objective formulation, and writing pedagogy. The questionnaire consisted of Likert-scale items measuring perceived competence gaps and instructional challenges. Third, a Trial Evaluation Questionnaire was used during the field trial phase to examine the framework's practicality, usability, and perceived effectiveness. All instruments were pilot-tested prior to administration, demonstrated acceptable reliability, and were complemented by semi-structured interviews and instructional artifacts to support data triangulation.

Data Analysis

Data were analyzed using a convergent mixed-methods approach. Quantitative data obtained from questionnaires were analyzed using descriptive statistics and inferential tests to examine the validity, reliability, and effectiveness of the developed framework. Pre- and post-test data were compared to identify changes in pre-service EFL teachers' instructional planning competence. Qualitative data from interviews and instructional materials were analyzed thematically to capture participants' experiences, implementation challenges, and perceptions of the framework. Coding and categorization were conducted systematically to identify recurring patterns and themes. Findings from both quantitative and qualitative analyses were integrated during interpretation through triangulation, allowing a comprehensive evaluation of the framework's pedagogical effectiveness and contextual applicability.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

This section reports the empirical findings in relation to the three guiding research questions (RQs). Quantitative results are presented using inferential statistical analyses to demonstrate the framework's validity and effectiveness, while qualitative findings are analyzed thematically to provide interpretive depth and contextual explanation. Statistical analyses were conducted using SPSS v.28, and qualitative data were processed with NVivo v.12. Assumptions of normality and homogeneity were satisfied, as indicated by Shapiro-Wilk ($p > .05$) and Levene's tests ($p > .05$). Tables and figures are used to summarize key statistical outcomes, followed by concise narrative syntheses highlighting their pedagogical significance.

Validity and Methodological Rigor of the SMART-Based Framework (RQ1)

Expert validation results demonstrated strong theoretical soundness of the developed framework, as indicated by high content validity ($CVI = 0.85$) and substantial inter-rater reliability ($\kappa = 0.82$). A repeated-measures ANOVA revealed statistically significant differences across evaluation dimensions, $F(3, 12) = 12.78, p < .001, \eta^2 = .76$. As presented in Table 1, content relevance received the highest expert rating ($M = 90.0\%$), significantly surpassing practicality ($M = 82.0\%, p = .008$).

Table 1
Expert validation scores across framework dimensions ($n = 5$)

Dimension	M (%)	SD	95% CI	F (3, 12)	p	η^2	Post-hoc Comparison
Content Relevance	90.0	2.1	[87.4, 92.6]	12.78	<.001	.76	Higher than Practicality ($p = .008$)
Systematicity	88.0	3.5	[84.1, 91.9]	–	–	–	Not significantly different
Clarity	85.0	4.2	[80.2, 89.8]	–	–	–	Not significantly different
Practicality	82.0	3.8	[77.5, 86.5]	–	–	–	Lower than Content Relevance

These findings indicate that the SAM-driven development cycle effectively generated a conceptually coherent and methodologically robust framework. However, expert feedback suggested that practical implementation was comparatively weaker than theoretical alignment, highlighting the need for additional instructional scaffolds and contextual exemplars to support classroom application. This finding underscores the ongoing challenge in teacher education of balancing conceptual rigor with practical usability.

Implementation Challenges in Applying the SMART-Based Framework (RQ2)

Qualitative thematic analysis demonstrated high coding reliability ($\kappa = 0.87$) and identified three interrelated implementation challenges: genre-specific adaptation, time-bound implementation, and ambiguity in defining measurable indicators. These themes are summarized with supporting evidence in Table 2.

Table 2
Thematic analysis of implementation challenges ($n = 22$)

Theme	Description	Illustrative Quote	Triangulation Evidence
Genre-Specific Application	Difficulty adapting SMART objectives across writing genres	“The framework works well for essays, but I need more guidance for creative writing.”	Lesson plan artifacts showing genre misalignment
Time-Bound Implementation	Struggles in estimating realistic timelines for writing cycles	“I underestimated how long peer feedback would take.”	Member checking confirmed by 90% of participants
Technical Terminology Ambiguity	Confusion over ‘measurable indicators’ for subjective skills	“What exactly does ‘measurable indicator’ mean for creativity or voice?”	External audit ($\kappa = 0.82$)

Building on the validation phase, the findings indicate that although participants valued the framework’s clarity, they experienced difficulty operationalizing its components in complex writing contexts. Quantitative evidence further showed that 46% of participants requested genre-specific exemplars, while 32% identified the time-bound component as the most challenging, suggesting that concerns centered more on practical implementation than on conceptual understanding.

Effects of the SMART-Based Framework on Pre-Service EFL Teachers’ Pedagogical Competence in Designing Writing Materials (RQ3)

A paired-samples t-test revealed a statistically significant improvement in participants’ ability to formulate SMART-aligned objectives, with higher post-test scores ($M = 8.7$, $SD = 1.5$) compared to pre-test scores ($M = 5.2$, $SD = 1.8$), $t(21) = 7.85$, $p < .001$, Cohen’s $d = 1.68$. This improvement is illustrated in Figure 1.

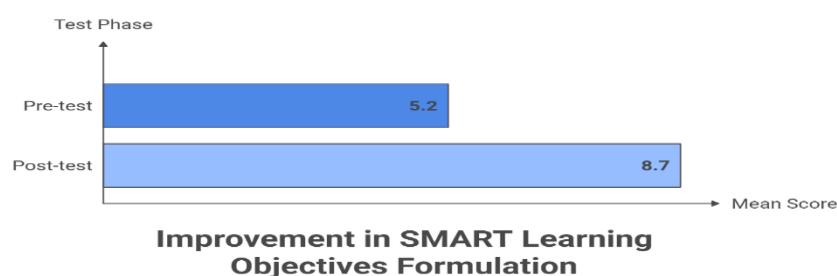


Figure 1. Pre- and post-test performance on SMART-based objective formulation (n = 22)

Figure 1 presents the mean scores of participants' ability to formulate SMART-based objectives before and after the test. The results of a paired-samples t-test indicated a significant increase from the pre-test ($M = 5.2$) to the post-test ($M = 8.7$), $t(21) = 7.85$, $p < .001$, with a large effect size (Cohen's $d = 1.68$). The distribution of error bars further supports the stability of the observed improvement. Further analysis using repeated-measures ANOVA demonstrated significant gains across all five SMART dimensions, $F(4, 84) = 15.37$, $p < .001$, $\eta^2 = .42$. The most pronounced improvements were found in the Measurable and Time-bound components. To identify predictors of framework effectiveness, a multiple regression analysis was conducted. The model accounted for a substantial proportion of variance ($R^2 = .67$, adjusted $R^2 = .61$, $F(4, 17) = 8.92$, $p < .001$). Content relevance ($\beta = .43$, $p = .003$) and practicality ($\beta = .37$, $p = .004$) emerged as the strongest predictors of overall effectiveness, as summarized in Table 3.

Table 3
Multiple Regression Analysis Predicting Overall Framework Effectiveness (n = 22)

Predictor	B	SE B	β	t	p	95% CI
Content Relevance	0.52	0.15	.43	3.47	.003	[0.21, 0.83]
Practicality	0.46	0.14	.37	3.29	.004	[0.17, 0.75]
Systematicity	0.31	0.13	.26	2.38	.029	[0.04, 0.58]
Clarity	0.25	0.12	.21	2.08	.052	[-0.01, 0.51]
Constant	2.17	0.89	—	2.44	.025	[0.32, 4.02]

Note. Dependent variable: Overall framework effectiveness (scale 0–100). $R^2 = .67$, adjusted $R^2 = .61$, $F(4, 17) = 8.92$, $p < .001$. Regression assumptions were met (VIF < 2.0; Durbin-Watson = 1.87).

As shown in Table 3, Content Relevance ($\beta = .43$, $p = .003$) and Practicality ($\beta = .37$, $p = .004$) emerged as the strongest predictors of overall framework effectiveness. This result indicates that perceived classroom usability plays a role comparable to theoretical soundness in determining the framework's instructional impact.

Synthesis of Findings

Across the three research questions, the findings converge on a central conclusion: the SMART-based framework is conceptually valid and empirically effective in enhancing pre-service EFL teachers' competence, yet its successful implementation is contingent upon contextual adaptability. Cross-analysis of Table 1, Table 2, and Figure 1 reveals a consistent pattern: conceptual rigor alone is insufficient without instructional scaffolds that accommodate genre diversity, flexible timelines, and clearly operationalized performance indicators.

The synthesis highlights three key contributions. Theoretically, the findings support a praxis-oriented approach to instructional design that balances goal clarity with the creative and iterative nature of writing pedagogy. Practically, the results indicate that teacher preparation programs should complement instructional frameworks with genre-specific exemplars, adaptive scheduling, and explicit assessment rubrics to enhance usability. Methodologically,

the study demonstrates the value of mixed-methods validation by integrating expert review, statistical analysis, and qualitative triangulation to achieve both rigor and ecological validity. Collectively, these findings clarify not only the potential of the SMART-based framework but also the conditions necessary for its sustainable adoption in teacher education contexts.

Discussion

The findings of this study, which developed and validated a SMART-based instructional framework through the Successive Approximation Model (SAM), underscore its significance in enhancing the instructional competence of pre-service teachers in the English as a Foreign Language (EFL) context. The empirical evidence confirms not only the framework's theoretical rigor and pedagogical effectiveness but also highlights contextual constraints that warrant further scholarly attention. Accordingly, this discussion situates the findings within existing literature, elucidates their theoretical and pedagogical implications, and outlines directions for future research.

The integration of SMART principles into the SAM cycle represents a substantive refinement in instructional design for EFL teacher education. This approach enables pre-service EFL teachers to internalize pedagogical practices progressively through structured goal-setting and continuous reflective iteration. Such a dynamic interaction between precision and adaptability addresses a longstanding challenge in instructional design, balancing conceptual complexity with practical enactment. Previous studies have similarly emphasized the importance of well-designed pedagogical frameworks in supporting pre-service teachers' professional development, particularly in fostering the effective application of pedagogical knowledge in classroom practice (Liu et al., 2022; Li et al., 2023).

From a theoretical perspective, the SMART-SAM framework extends Shulman's Pedagogical Content Knowledge (PCK) model by operationalizing pedagogical understanding into measurable and revisable instructional actions. While traditional PCK frameworks focus on teachers' knowledge of content and pedagogy, this study demonstrates how such knowledge can be translated into concrete instructional decisions through structured goal formulation and iterative refinement. This operationalization aligns with prior work emphasizing the need to bridge pedagogical theory and practice through reflective, data-informed instructional models (Reynolds & Park, 2020; Wu & Wang, 2015). The observed relationship between cognitive clarity, procedural adaptability, and instructional effectiveness further reinforces calls for dynamic teacher education frameworks that move beyond static conceptions of teaching competence.

Pedagogically, the findings indicate that the SMART-SAM framework significantly enhances pre-service EFL teachers' abilities in lesson planning, writing pedagogy, and reflective evaluation. Quantitative improvements in SMART-aligned objective formulation were complemented by qualitative evidence of increased self-regulation and instructional awareness, supporting previous research that highlights structured goal-setting as a powerful metacognitive scaffold in teacher learning (Rafiq et al., 2022; Reynolds & Park, 2020). In line with Wang and Zhan (2023), the framework facilitates meaningful connections between content knowledge and pedagogical practice, enabling teachers to design instruction that is both coherent and adaptable to contextual demands.

Beyond classroom-level implications, the SMART-SAM framework offers a replicable model for integrating design thinking and reflective practice into teacher preparation curricula. This alignment is particularly relevant in educational systems emphasizing outcome-based and evidence-driven reforms, where coherence between theoretical foundations and instructional practice is critical (Wu & Wang, 2015). Prior research suggests that the adoption of structured, evidence-informed frameworks can strengthen the quality and consistency of teacher education programs across diverse settings (Deng et al., 2024). Future research should therefore examine

the scalability and adaptability of the SMART–SAM framework across institutional, cultural, and digital learning environments to further evaluate its broader impact on teacher development and student learning outcomes (Choi & Chung, 2025).

In summary, the SMART–SAM instructional framework represents a robust and context-sensitive approach to enhancing instructional competence among pre-service EFL teachers. By embedding goal-oriented instructional design within an iterative reflective model, this study contributes to evolving paradigms in teacher education that prioritize both pedagogical rigor and practical implementation. Continued investigation across varied educational contexts will be essential to fully establish the framework's long-term effectiveness and sustainability.

CONCLUSION

This study demonstrates that integrating the SMART framework within the Successive Approximation Model (SAM) provides a theoretically sound and pedagogically effective approach to enhancing pre-service EFL teachers' competence in instructional planning and writing pedagogy. The mixed-methods findings reveal significant improvements in formulating measurable objectives, designing genre-sensitive instructional materials, and engaging in reflective revision practices. The SMART–SAM synergy effectively bridges the gap between goal-setting precision and instructional adaptability, addressing a persistent challenge in teacher education.

Pedagogically, embedding SMART-based design principles within teacher education curricula strengthens pre-service EFL teachers' reflective and metacognitive capacities while promoting greater accountability in instructional decision-making. The iterative nature of SAM supports continuous feedback and alignment with authentic classroom contexts, highlighting the value of structured yet flexible instructional design.

At the policy level, the findings support the adoption of evidence-based, outcome-oriented frameworks that emphasize goal clarity, reflective iteration, and contextual responsiveness in teacher education programs. Future research should examine the scalability and sustainability of the SMART–SAM model across diverse institutional and digital learning environments, as well as its long-term impact on student learning outcomes. Finally, the study positions the SMART–SAM framework as a viable pathway for advancing reflective, data-informed, and pedagogically agile EFL teacher preparation.

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