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Effects of SRSD Plus Supervised Implementation on Preservice Primary Teacher's Content Knowledge and Self-efficacy for Teaching Reading

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ABSTRACT: This study investigates the impact of implementing the self-regulated strategy development plus (SRSD Plus) instructional framework, which integrates reading and writing instruction with self-regulation strategies, on preservice primary teachers' content knowledge and self-efficacy for teaching reading. The framework has shown promise in benefitting student literacy outcomes. However, its effects on educators, particularly those in training, remain underexplored. The research employed a quasi-experimental pretest-posttest design with 66 student teachers randomly assigned to either an experimental group, which received the SRSD Plus training and implemented the framework over their 12-week final-year practicum, or a control group that underwent a business-as-usual practicum experience. Post-intervention, the treatment group demonstrated significantly greater improvements in content knowledge for teaching reading compared to their counterparts. This was particularly evident in their ability to apply pedagogical content knowledge, translating understanding of linguistic structures and reading development into effective instructional decisions. Concurrently, their self-efficacy for teaching reading declined relative to the comparison group. This result suggests that the complexity of mastering and delivering the integrated SRSD Plus model may have heightened preservice teachers' awareness of the challenges involved in effective literacy instruction, leading to a temporary dip in confidence despite growing expertise. The study highlights the potential of the integrated literacy instruction framework to deepen preservice teachers' pedagogical content knowledge but also underscores the need for intentional support to nurture self-efficacy alongside competence. This research contributes to the broader discourse on teacher education, advocating for a balanced approach that integrates rigorous instructional models with robust mentoring and reflective practices.

Keywords: literacy instruction, practice-based professional development, reading-writing, self-regulated strategy development, teacher education.

I. INTRODUCTION

Literacy sits at the heart of modern life, influencing economic mobility, physical and mental health, family stability, and civic participation [1]. When individuals read and write with confidence, they unlock educational pathways and workforce opportunities that remain closed to those who struggle. Yet large numbers of learners worldwide still falter in mastering these intertwined skills [2, 3], placing them at risk for long-term academic and social challenges. Reading involves far more than sounding out letters. It is a

complex meaning-making process that requires readers to decode written symbols [4]. Children who gain momentum early in reading are more likely to thrive across the curriculum, whereas weak readers face a heightened probability of grade retention and school dropout [5, 6]. Strong word-level reading, for example, predicts superior science literacy because accurate, fluent decoding frees cognitive resources for higher-order reasoning [7], which is critical for knowledge transferability [8].

Writing is typically the last language skill to develop and arguably the most demanding. During composition, writers must juggle idea generation, logical organization, precise word choice, syntax, and the conventions of spelling and punctuation - often simultaneously [9]. In classrooms, written products offer a window into students' thinking and frequently anchor assessment practices [10]. Proficiency in writing even spills over into seemingly distant subjects; gains in written expression have been linked to stronger mathematics performance, likely because writing clarifies conceptual understanding [11].

II. RELATED WORK

While the critical role of reading and writing skills is clear, the question remains: how can educators most effectively support students, especially those who struggle, in developing these foundational abilities?

One instructional framework showing particular promise in this domain is self-regulated strategy development (SRSD), which blends explicit strategy instruction with systematic scaffolding of self-regulation, enabling students with and without learning disabilities to take control of their learning [12]. Global evidence suggests that instruction in writing, guided by the principles of SRSD, makes students better writers [13]. For instance, a quasi-experimental study [14] compared the effectiveness of SRSD versus regular writing instruction among 52 fourth- and fifth-grade French students from disadvantaged backgrounds in a real-life classroom setting. The SRSD group significantly bolstered their ability to produce and evaluate high-quality texts within a short timeframe, dedicating more time to drafting and writing stories that contained a greater number of essential story components and ideas compared to counterparts.

Beyond writing, recent adaptations have extended SRSD to reading comprehension and to executive-function components that undergird self-regulated learning, which is "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" [15]. A pre-posttest study [16] probed the effectiveness of an SRSD-based opinion essay writing intervention among 645 second and fourth graders from 12 public schools. The manipulated condition significantly improved planning quality, text productivity, structural elements, and text quality for both grades compared to controls, with fourth graders showing greater gains in structural elements. Reading comprehension progressed only for some fourth graders in the SRSD cohort, while no group had gains in spelling accuracy.

A meta-analysis [17] examined the effectiveness of 11 SRSD reading interventions for 199 students with a variety of disabilities such as mood disorder. The synthesis found that SRSD was generally effective, with a large overall effect size, though only two studies met all quality indicators, implying insufficient evidence to classify SRSD as an evidence-based practice for reading comprehension in that population. One exploration [18] involved 97 third graders randomly assigned to three groups: SRSD+attention, SRSD+transcription, and wait list. The SRSD+attention condition combined SRSD writing instruction with 5-minute focused breathing meditation exercises to improve attention, using specific textual mnemonics for planning argumentative essays alongside self-regulation strategies. The SRSD+transcription condition paired SRSD with copying and alphabet exercises to promote handwriting fluency. The latter group outperformed others in handwriting fluency and spelling accuracy among weaker spellers, while both SRSD groups showed improved planning skills, text completeness, and executive functions compared to the wait list.

Implementations of SRSD for second language acquisition was documented as well. An experimental study [19] went into the effects of SRSD revision instruction on 120 Chinese 11th-grade students' English persuasive essay writing and revision skills. The SRSD-only condition included using an analytical writing rubric. The SRSD plus peer interaction group added collaborative peer feedback, where students discussed and evaluated each other's essays using the same rubric to enhance self-regulation. The main findings showed that both SRSD conditions significantly boosted text length and higher-order writing dimensions

relative to non-involved students, with the SRSD plus peer interaction cohort yielding greater elevations in text quality and frequency of high-quality revisions.

Positive student outcomes have spurred efforts to prepare in-service teachers via practice-based professional development (PBPD) that models SRSD strategies, provides coaching, and supplies structured materials [14]. Thence, research has celebrated the value of such training. For example, in a wait-listed quasi-experimental study [20], 8 intervention teachers from 11 schools received two days of PBPD to implement a ten-week SRSD intervention targeting persuasive and informational writing among fourth-graders. Eventually, the students had significantly better writing outcomes compared to no-intervention peers, and educators reported high satisfaction with the practice.

Furthermore, recent scholarship has increasingly emphasized the imperative of systematically integrating reading and writing instruction rather than teaching these skills in isolation [21]. One instance of successfully encompassing both reading-writing confluence and PBPD is a randomized controlled trial [22], which examined the impact of SRSD Plus, a classroom-based program delivering integrated reading and writing instruction for first and second-grade students. This dual-component approach combines SRSD instruction – emphasizing interactive, discourse-based learning about writing processes, text structure, audience considerations, and self-regulation strategies including self-reinforcement – with Plus instruction that systematically addresses foundational literacy elements such as word reading and sentence structure. The intervention is grounded in the Interactive Dynamic Literacy Model proposed by the authors, which theorizes that reading and writing draw on shared components, such as orthographic knowledge and self-regulatory capabilities. This theoretical framework also posits that progress in one literacy domain fosters development in the other, as reading experiences strengthen mental representations essential to both reading and writing while writing experiences similarly enhance reading skills through shared cognitive and linguistic processes, thereby justifying the integrated instructional design that leverages natural synergies between reading and writing to accelerate overall literacy development more effectively than isolated skill instruction. For example, in a typical SRSD Plus lesson on animal habitats, students first engage in close reading of an informational text, identifying key vocabulary like “среда обитания” (habitat) and sentence structures such as comparative adjectives (e.g., “больше, чем” – bigger than). They then apply self-regulation strategies to plan and write an explanatory paragraph, using prompts like “Does this sentence connect my reading ideas to my writing?” This process illustrates how decoding and comprehension from reading directly inform organization and expression in writing, reinforcing shared skills like vocabulary and syntax. Ultimately, the primary students who received SRSD Plus three times weekly across 36 sessions over 12-14 week outperformed non-treated ones in spelling, vocabulary, sentence proficiency, planning, discourse knowledge, along with writing productivity and quality in the informational genre, with transfer effects to opinion writing, but showed no significant betterments in word reading or handwriting fluency [22].

Another inquiry engaged 47 first- and second-grade students [23] in SRSD Plus as a mix of transcription, oral language and SRSD instruction for close reading of science texts to write informative essays. In 10 weeks of the manipulations, students’ writing skills, including essay quality and use of transition words, mounted significantly. Nonetheless, no significant effects were observed for handwriting fluency.

III. THIS STUDY

Scant work has explored how preservice teachers fare when they enact SRSD Plus during practicum. Do they deepen their content knowledge for teaching reading? Do they feel more capable of guiding learners through complex literacy tasks? Prior explorative studies concerning SRSD and its augmented iteration, SRSD Plus, have primarily concentrated on assessing their direct impact on students’ outcomes (22, 24 – 26). Such investigations have consistently highlighted the efficacy of these pedagogical models in cultivating robust literacy skills and self-regulatory behaviors within elementary learners. However, a notable lacuna exists within the extant literature: the influence of implementing the integrated literacy instruction model on the educators themselves has largely remained unexplored. While considerable attention has been devoted to understanding the effects of reading and writing pedagogy on its ultimate beneficiaries (the school

population) the ramifications for the pedagogical practitioners responsible for its delivery have not been investigated to date.

The present inquiry endeavors to addresses this omission. It holds substantial scientific merit, representing a pioneering effort to examine the impact of SRSD Plus supervised implementation on preservice primary teachers. By shifting the analytic lens from learners to educators, this paper can add to the discourse surrounding teacher preparation and effective literacy instruction. Focusing on preservice teachers' development is crucial in literacy teacher education because it directly impacts future student learning outcomes and bridges the gap between theoretical training and practical application, ensuring that future educators are not only knowledgeable but also confident in implementing evidence-based practices. Unlike studies that solely examine student outcomes, which often overlook the teacher's growth process, this approach reveals how hands-on implementation can enhance pedagogical skills, potentially leading to more sustainable improvements in classroom instruction across diverse settings. The following research questions guided the investigation:

- Does supervised implementation of SRSD Plus influence preservice primary teachers' content knowledge for teaching reading compared to a business-as-usual practicum experience?
- Does supervised implementation of SRSD Plus influence preservice primary teachers' self-efficacy for teaching reading compared to a business-as-usual practicum experience?

Reading instruction was chosen as the focal outcome because decoding and comprehension form the cornerstone of elementary literacy. Demonstrating growth in preservice teachers' knowledge and confidence for teaching reading, therefore, serves as a sensitive barometer of broader pedagogical development within an integrated, self-regulation-infused literacy framework.

IV. MATERIAL AND METHOD

1. RESEARCH DESIGN AND SAMPLE

A quasi-experimental pretest-posttest design with repeated measures was employed to examine the effects of SRSD Plus supervised implementation. This design was selected over a full experimental one due to practical constraints in educational settings, such as the inability to fully randomize classroom assignments and the need to integrate the intervention within existing practicum structures without disrupting school operations. The investigation was conducted during the 2024-2025 academic year. The study enlisted 66 preservice generalist primary teachers enrolled in a four-year Bachelor of Education degree program at a public university in [blinded for review]. The inclusion criterion mandated completion of a second-year language education module as part of the undergraduate program. This prerequisite ensured that participants possessed foundational knowledge of language instruction principles before engaging with the SRSD Plus implementation during their final-year school practicum. The participants were native Russian speakers and ranged in age from 21 to 23 years, with the majority (98%) being female. The demographic composition reflected the typical enrollment patterns in teacher education programs within the region, characterized by predominantly female students. Participants were randomly assigned to either the SRSD Plus condition (n = 33) or the business-as-usual (BAU) control condition (n = 33). All participants completed identical measures at baseline and post-practicum to evaluate changes in their content knowledge and self-efficacy for teaching reading. The study was reviewed and approved by the research ethics board at the corresponding author's institution. Participants provided informed consent, and all data was kept confidential.

2. EXPERIMENTAL PROCEDURES

The experimental condition entailed a comprehensive 12-week supervised implementation of SRSD Plus, meticulously integrated within the participants' final-year school practicum experience. The SRSD Plus framework comprised two principal components: a core SRSD instruction module, complemented by a 'Plus' portion. This adaptation of what was previously administered among in-service teachers [22] maintained the

core elements of PBPD while acknowledging the developmental stage of student teachers who are still mastering basic pedagogical skills.

The intervention spanned 12 weeks of the practicum experience, preceded by the two-week orientation phase where participants received intensive training from experienced hybrid teachers on SRSD Plus theory and instructional protocols. The research team conducted interactive modeling of reading-writing lessons, demonstrating effective instructional practices. Trainees were afforded opportunities to lead the integrated literacy instruction themselves during these training sessions, receiving immediate feedback from both their peers and the professional development leaders. This preparatory phase aimed to ensure that student teachers acquired both the declarative and procedural knowledge necessary to deploy SRSD Plus effectively in authentic classroom settings.

The 12-weeks-long implementation phase constituted the core of the intervention and was structured into seven units, with each unit comprising five sessions approximately 45 minutes each, delivered thrice weekly, during which preservice teachers applied SRSD Plus strategies within their practicum classrooms under close supervision. Each participant was assigned to a primary grade classroom (grades 1 and 2) in local partner schools, where they worked with small groups of students under the guidance of both university supervisors and classroom mentor teachers. Anchor informational texts were specifically chosen to incorporate targeted vocabulary, varied sentence structures, common Russian spelling patterns, and salient structural elements characteristic of expository writing.

In line with the SRSD Plus stances [22], target vocabulary comprised high-frequency words, such as “существенный” (essential) and “контраст” (contrast), alongside scientific content words like “фотосинтез” (photosynthesis) and “среда обитания” (habitat). All vocabulary items were carefully extracted from the anchor texts, with the majority serving as key terms for comprehending the text and grasping the central theme of each unit. The teaching of this vocabulary words incorporated established evidence-based practices, including providing child-friendly definitions and illustrative sentences in addition to those found within the anchor texts [21]. Vocabulary instruction was intricately woven into the ‘Plus’ component as part of comprehensive vocabulary and reading comprehension instruction, and also integrated into the SRSD section, where students reviewed key vocabulary and engaged in re-reading texts to deepen understanding of both content and text structure.

Instruction on target sentence structures was tailored to the specific grade levels. For instance, in grade 1, concepts such as the definition of a sentence, the accurate use of coordinating conjunctions like “и” (and) and “но” (but), and high-frequency subordinating conjunctions such as “когда” (when), “потому что” (because), and “после того как” (after) were emphasized. In grade 2, instruction extended to include accurate use of “но” (but) and “так что” (so/therefore), adding adverbs for expression, and employing adjectives in comparative structures such as “настолько (прилагательное), что...” (so [adjective] that...) and “слишком (прилагательное), чтобы (глагол)...” (too [adjective] to [verb]...). The use of conjunctive adverbs like “однако” (however) was also introduced. These structures were taught through sentence combination and completion activities. “Session 1 introduced target words and sentence structures followed by practice activities; session 2 involved reading anchor texts with focused attention on target words, sentence structures, and key ideas, alongside review and further practice activities for vocabulary and sentence structures.”

Spelling and word reading instruction employed a word study approach, wherein the phonological, orthographic, and morphological structures of Russian words were explicitly taught. Student teachers introduced learners to words featuring target patterns (for example, common vowel patterns, consonant clusters, soft/hard signs, common prefixes/suffixes) and facilitated word sorting activities [27]. Learners were provided ample opportunities to read words, discern patterns, and accurately spell words. Examples of target patterns adapted for the Russian language context included common patterns for stressed and unstressed vowels, consonant assimilation or dissimilation, the function of soft (ь) and hard (ъ) signs, and frequently occurring derivational suffixes (for example, -ость, -ение) and prefixes (for example, при-, пере-). To parallel the original intervention, handwriting instruction acknowledged the speed facet of handwriting and included letter copying and recalling activities with corrective feedback. “Session 3 introduced target spelling patterns via teacher-directed and student-led sorting activities; Session 4 incorporated handwriting

practice, group spelling sorts, recording of spelling patterns in spelling journals, and a word hunt; and Session 5 featured group work building, additional handwriting practice, and spelling from memory, culminating in an overall review."

The central goal of SRSD is to support young learners in cultivating self-regulation to navigate the writing process and their behavior [28]. Therefore, the trainees encouraged students to employ text revision techniques via simplified self-regulation prompts [19], such as self-instructions (for example, I will check my sentence to make sure it makes sense), self-evaluation (e.g., Does this word really end with z?), and self-reinforcement (for example, I did a great job choosing a better word!).

Throughout the intervention, university supervisors contacted each participant individually weekly to discuss instructional progress and implementation challenges, thus serving as instructional coordinators. Moreover, the supervisors weekly monitored fidelity to the SRSD Plus model through classroom observations.

Participants assigned to the BAU condition completed their final-year school practicum following the standard university curriculum without exposure to the SRSD Plus model. They engaged in comparable amounts of practicum teaching but received conventional supervision not focusing on reading or writing instruction techniques. For word reading and spelling, these trainees explicitly taught Cyrillic letter-sound correspondences and syllable formation (for example, ма-ма, кни-га), using dictation exercises and copybooks to reinforce spelling rules like soft/hard signs and vowel reduction. In contrast, some focused on morphological patterns (for example, noun cases, verb conjugations) to build decoding skills. For reading comprehension and written composition, student teachers emphasized narrative texts, such as Russian fairy tales, and descriptive writing, using graphic organizers to map story elements (characters, setting, moral) and linguistic features (roots, suffixes), alongside comprehension questions and retelling tasks. The BAU participants were offered access to SRSD Plus materials and abbreviated training after the completion of exit data collection. This approach ensured that all preservice teachers ultimately benefited from exposure to evidence-based literacy instruction training.

3. INSTRUMENTS

Two primary instruments were utilized to assess changes in participants' content knowledge and self-efficacy for teaching reading:

Content Knowledge for Teaching Reading assessment (CKT-R; [29]) served as the measure of participants' specialized knowledge for teaching reading. This multiple-choice assessment encompasses 77 items organized around two primary domains: comprehension and word analysis. The comprehension domain consisted of 10 situations or scenarios with 42 items divided between knowledge of content (6 situations, 24 items, reported Cronbach's alpha = 0.75) and knowledge of teaching and content (4 situations, 18 items, reported Cronbach's alpha = 0.67). The word analysis domain included six situations with 35 items assessing knowledge of content (reported Cronbach's alpha = 0.82). The CKT-R presents respondents with authentic teaching scenarios that require application of specialized knowledge about reading development, instruction, and assessment. Correct responses received a score of 1, while incorrect responses received 0. Within-domain scores were summed to represent participants' total score for each domain.

Since the original CKT-R was developed in English, the instrument underwent rigorous adaptation for use with Russian-speaking participants. The adaptation process involved forward and backward translation by bilingual experts in reading education, followed by cognitive interviews with five bilingual reading specialists to ensure conceptual equivalence. Linguistic challenges, such as differences in orthographic systems (for example, Cyrillic vs. Latin alphabet) and language-specific reading scenarios (for example, adapting examples to Russian phonology and morphology), were addressed by consulting local Russian-speaking educators to refine terminology and ensure items reflected local pedagogical practices, thereby maintaining validity and reliability. The adapted instrument was piloted with nine student teachers from a non-sampled university to verify clarity, cultural appropriateness, and technical quality. The procedures involved administering the instrument to participants, followed by debriefing sessions to identify ambiguities. The pilot testing revealed acceptable psychometric properties, with Cronbach's alpha values of 0.74 for the comprehension domain and 0.80 for the word analysis domain in the Russian adaptation.

Teacher Efficacy Scale for the Teaching of Reading (TESTR; [30]) assessed participants' self-efficacy beliefs regarding their capability to teach reading effectively. This self-report questionnaire comprises 28 items accommodated in a single factor structure. Respondents rated their degree of confidence in their ability to teach reading on a scale from 0 (no confidence at all) to 100 (completely confident). The TESTR evaluates self-efficacy across multiple dimensions of reading instruction, including phonemic awareness, phonics, fluency, vocabulary, and comprehension. The original instrument reportedly demonstrated excellent internal consistency reliability (Cronbach's alpha = 0.98) and construct validity through principal components analysis.

Similar to the CKT-R, the TESTR underwent methodical adaptation for the Russian-speaking context. The adaptation process paralleled that of the CKT-R, with forward and backward translation, expert review, and pilot testing. The Russian adaptation of the TESTR demonstrated adequate internal consistency (Cronbach's alpha = 0.84) during pilot testing with nine student teachers from a non-sampled university.

4. RELIABILITY AND VALIDITY EVIDENCE

To ensure the soundness of the adapted instruments for the present study, several steps were taken. Evidence of content validity was established through the expert review process during translation, where scholars confirmed the relevance and representativeness of the items for the Russian literacy curriculum. Construct validity was supported by the pilot testing results, which showed that the item-total correlations were within acceptable ranges, suggesting that the items measured the intended constructs. Reliability was assessed using Cronbach's alpha; the pilot coefficients (0.77 to 0.91) indicated acceptable to good internal consistency for the adapted scales. These measures provided reasonable assurance that the instruments were reliable and valid for use with the target population.

5. STATISTICAL STRATEGY

For each outcome variable, a Bayesian linear mixed model was fitted. Rather than relying solely on p-values to accept or reject a hypothesis, this method calculates the probability that an effect exists given the data. Each model included group effect (BAU vs. SRSD), time effect (baseline vs. post-evaluation), and their interaction (time×group) as fixed effects. To account for the repeated measures design and individual variability, participant id was incorporated as a random intercept. The models were estimated using Markov Chain Monte Carlo sampling. Specifically, two independent chains were run for 2,000 iterations each, with the first 1,000 iterations per chain designated as warm-up to allow the sampler to converge to the posterior distribution. Posterior means for all fixed effects were derived from the aggregated samples of the posterior distribution, representing the most probable values for the parameters given the observed data. For inferring the "significance" of effects within the Bayesian framework, we examined the 95% credible intervals (CI) of the posterior distributions for each parameter. An effect was considered statistically discernible if its 95% CI did not encompass zero, indicating that values inconsistent with the estimated effect were highly improbable given the model and data. To quantify the magnitude of observed effects, Cohen's d criterion was computed. The statistical strategy was enacted in the R programming environment (version 4.5.1) using the *rstanarm* package, which leverages the Stan probabilistic programming language for Bayesian inference.

V. RESULTS

Descriptive statistics for the response variables are displayed in Table 1. Regarding the knowledge of content subscale, the Bayesian linear mixed model revealed that the main effect of group was statistically discernible (posterior mean = 1.70; 95% CI [0.81, 2.57]), favoring the SRSD group with a Cohen's d of 0.69. The main effect of time was not statistically significant (posterior mean = 0.67; 95% CI [-0.15, 1.46]). Furthermore, the interaction effect between group and time for this variable was significant (posterior mean = 2.15; 95% CI [1.02, 3.30]), indicating that the improvement over time differed between groups, favoring the SRSD condition (d = 0.87).

Table 1. Summary of participants' perceptions of self-efficacy and resilience for inclusive teaching.

Variable	Group	Pre-test	Post-test
Content knowledge for teaching reading (total)	BAU	44.21 (3.90)	47.18 (4.10)
	SRSD	46.09 (3.83)	65.15 (3.37)
knowledge of content	BAU	14.33 (1.91)	15.0 (1.54)
	SRSD	16.03 (1.72)	18.85 (1.86)
knowledge of teaching and content	BAU	9.91 (1.77)	10.39 (1.62)
	SRSD	9.30 (1.91)	17.48 (0.80)
word analysis	BAU	19.97 (1.65)	21.79 (2.07)
	SRSD	20.76 (1.66)	28.82 (1.98)
Self-efficacy in reading teaching	BAU	66.45 (1.76)	77.0 (1.52)
	SRSD	54.08 (2.08)	48.25 (1.34)

Turning to the knowledge of teaching and content, the Bayesian model indicated that neither the primary influence of group (posterior mean = -0.62; 95% CI [-1.40, 0.17]) nor the temporal main effect (posterior mean = 0.47; 95% CI [-0.23, 1.17]) achieved statistical significance. However, a robust and statistically significant interaction effect was identified (posterior mean = 7.71; 95% CI [6.73, 8.70]), indicating that the trajectory of improvement over time was markedly different between the groups, with the SRSD individuals experiencing a stronger gain (d = 2.09).

As for the word analysis scores, the main effect of group was not found to be statistically significant (posterior mean = 0.79; 95% CI [-0.10, 1.72]). Nevertheless, participants showed a significant overall enhancement in word performance from the baseline to the exit measurement, as evidenced by a substantial main effect of time (posterior mean = 1.83; 95% CI [0.95, 2.68]; d = 0.46). Critically, a statistically significant interaction term emerged (posterior mean = 6.22; 95% CI [4.99, 7.49]), signifying that the rate of improvement for word analysis scores varied considerably between the groups. This interactive pattern favored the SRSD group, indicating a more pronounced progression for participants in this condition (d = 1.57).

Regarding the total content knowledge performance, the main effect of group was not deemed statistically significant (posterior mean = 1.88; 95% CI [-0.05, 3.71]). However, a statistically discernible while small-to-medium enhancement was noted across both groups from time 1 to time 2 (posterior mean = 2.97; 95% CI [1.73, 4.29]); d = 0.32). Most notably, a highly significant interaction effect was present (posterior mean = 16.07; 95% CI [14.23, 17.95]), with greater scores in the SRSD cohort (d = 1.73).

Finally, the main effect of group for teaching self-efficacy was statistically significant (posterior mean = -12.36; 95% CI [-13.21, -11.55]), favoring the control group with a Cohen's d=1.09. Furthermore, the main effect of time was statistically significant (posterior mean = 10.56; 95% CI [9.84, 11.28]), indicating improvements from pre-evaluation to post-test (d=0.93). Most notably, a statistically important interaction effect was also present (posterior mean = -16.37; 95% CI [-17.41, -15.27]), favoring BAU with a Cohen's d of 1.45.

While Cohen's conventional guidelines suggest d = 0.2 as a small, d = 0.5 as a medium, and d = 0.8 as a large effect, it is important to consider the study's relatively modest sample size (33 persons per group). Research, such as [31], indicates that average effect sizes reported in studies with up to 100 participants can be substantially larger (e.g., 0.38) compared to those from very large samples (e.g., 0.11 from 2000+ participants). This suggests that effects observed in smaller studies, even if statistically significant, might appear more pronounced than their true population counterparts. Consequently, the interpretation of effect magnitudes here takes this contextual factor into account, encouraging a more cautious perspective on potentially inflated d values.

VI. DISCUSSION

The question of how young children best acquire reading skills has historically commanded substantial scholarly attention [32, 33]. Contemporary pedagogy increasingly advocates integrated literacy instruction, grounded in robust evidence demonstrating the synergistic relationship between reading and writing

processes across linguistic contexts [34 – 36]. This confluence leverages cognitive mechanisms where spelling practice reinforces orthographic mapping, consolidating word knowledge by strengthening connections between form, sound, and meaning [37]. Furthermore, proficient literacy integration demands not only foundational skills but also strategic self-regulation to navigate complex reading-to-write tasks [38].

The SRSD Plus framework directly addresses this imperative, synthesizing explicit instruction in reading-writing connections with structured scaffolding of metacognitive strategies. Specifically, it marries SRSD's core emphasis on self-regulated learning teaching learners to generate and adapt plans, monitor comprehension and composition, and employ self-reinforcement – with systematic Plus instruction targeting foundational literacy components like spelling within an integrated paradigm. While teaching practicum typically bolsters preservice educators' competence and confidence [39 – 41], this investigation uniquely examined whether implementing this multifaceted model during supervised field experience influences preservice primary teachers' specialized knowledge and self-perceived capability for reading instruction, compared to conventional practicum.

Results revealed a compelling divergence in outcomes. Preservice teachers implementing SRSD Plus demonstrated markedly enhanced content knowledge for teaching reading compared to their peers in the business-as-usual practicum. This advancement was particularly pronounced in their ability to apply pedagogical content knowledge translating understanding of linguistic structures, reading development, and text comprehension into effective instructional decisions. Deep engagement with the framework's integrated elements, such as analyzing anchor texts for target vocabulary and sentence structures while simultaneously guiding pupils in planning and revising connected writing using self-regulation prompts, evidently fostered a richer, more interconnected understanding of reading pedagogy.

It is important to recognize that mentor teacher variability and broader school contexts may have shaped the magnitude of these outcomes. Differences in mentor teachers' instructional expertise, willingness to model integrated literacy instruction, and ability to provide timely feedback could have influenced the quality and consistency of SRSD Plus enactment. Similarly, variations in school resources and scheduling flexibility may have created more or less supportive environments for practicum implementation. These contextual factors, while not the primary focus of the present analysis, represent important considerations for designing future studies that seek to optimize SRSD Plus delivery across diverse educational settings.

Conversely, the same immersive experience coincided with a relative decline in self-efficacy for teaching reading compared to the comparison condition. This counterintuitive finding suggests that the complexity inherent in mastering and delivering the integrated, strategy-rich SRSD Plus model during early field placement may have heightened preservice teachers' awareness of the challenges involved in effective literacy instruction. Implementing multiple novel components (simultaneously fostering foundational skills, text comprehension, composition, and self-regulation) likely induced a phase of "conscious incompetence," temporarily diminishing confidence despite growing expertise. This pattern aligns with the Dunning-Kruger effect, wherein increased competence initially leads to decreased confidence as individuals become more aware of the complexity and nuances within their domain [42]. The conventional practicum, focusing on more compartmentalized and familiar methods, may not have provoked similar self-scrutiny, allowing for steadier confidence growth. The temporary decline in self-efficacy could represent a healthy developmental phase where novice educators transition from naive confidence to informed awareness of professional growth areas. Such realistic self-assessment often precedes substantial competence gains and represents a crucial step toward expertise [43]. For SRSD Plus student-teachers, the decline may also reflect the challenge of reconciling newly acquired, research-based instructional methods with pre-existing teaching routines learned in earlier coursework and informal classroom experiences. When practicum placements require replacing familiar, compartmentalized literacy instruction with a multi-component, integrated model, perceived competence can temporarily diminish until the new approach becomes internalized and automatic. To support preservice teachers during this critical phase of "conscious incompetence," teacher training programs should implement targeted scaffolds. Practical strategies include structured peer debriefing sessions where trainees can articulate their frustrations and normalize the difficulty of implementation, thereby reducing isolation. Cognitive coaching by supervisors can help teachers separate the complexity of the model from their own capability, reframing struggles as evidence of learning rather

than failure. Additionally, celebrating “micro-wins” specific, small instances of successful student engagement or strategy use can help rebuild self-efficacy incrementally as master of the complex model develops.

In summary, the findings of this study offer several key implications for teacher training programs. First, integrated literacy models like SRSD Plus should not be viewed merely as interventions for students but as powerful vehicles for accelerating the pedagogical content knowledge of preservice teachers. Second, programs must anticipate and support the "efficacy dip" that accompanies the introduction of complex pedagogies; rather than interpreting low confidence as a failure of training, it should be framed as a necessary, albeit uncomfortable, stage of professional growth. Finally, successful implementation of such rigorous frameworks requires a shift in mentorship, moving from general supervision to specific, evidence-based coaching that addresses the cognitive load and emotional challenges novice teachers face when integrating reading, writing, and self-regulation.

The findings from this exploration highlight a crucial nuance: structured, evidence-based practicum models like SRSD Plus can act as powerful accelerators for pedagogical content knowledge but may initially unsettle novice teachers’ self-assurance. As one of the first studies to pivot the analytical lens from student outcomes to educator development within the SRSD paradigm, this research expands understanding of literacy teacher preparation. It demonstrates concretely that sophisticated integrated reading-writing-regulation frameworks can be successfully embedded within preservice practicums to deepen specialized knowledge. However, it simultaneously sounds a clarion call for programs to intentionally nurture self-efficacy alongside competence when implementing demanding pedagogies, perhaps through mentoring focused on normalizing challenges, collaborative reflection, and celebrating incremental mastery.

This study underscores the importance of integrating complex instructional frameworks into preservice teacher training. It demonstrates that while such frameworks can significantly enhance pedagogical content knowledge, they may also temporarily decrease self-efficacy as preservice teachers grapple with the complexities of new teaching methods.

Several design-specific limitations warrant acknowledgment. First, the quasi-experimental nature of the study, while robust in its use of random assignment and repeated measures, may still be subject to unmeasured contextual influences within practicum placements, such as variations in mentor teacher support or school resources. Second, the intensive supervision and feedback provided in the SRSD Plus condition may not be easily scalable in all teacher education contexts, potentially limiting the feasibility of widespread implementation. Third, the Russian-speaking context of the participants, with its emphasis on morphological and orthographic features unique to Cyrillic (for example, vowel reduction, soft/hard signs), may enhance the model's applicability to languages with complex phonology but limit generalizability to alphabetic systems like English. Additionally, the sample was demographically homogenous (predominantly female, native Russian speakers), which limits the generalizability of the findings to more diverse populations or different educational contexts. Future research should test the model in larger, more heterogeneous samples across multiple institutions to strengthen generalizability and to examine whether effects are consistent in varied linguistic, curricular, and resource settings. Multi-site trials would also allow for exploration of potential moderators, such as differences in university training curricula or mentor teacher expertise, which could shape both content knowledge gains and self-efficacy trajectories.

Adaptation for less resource-intensive environments could involve the use of recorded model lessons and peer coaching in place of constant supervisor presence, structured digital feedback platforms to reduce in-person observation demands, and streamlined instructional materials that retain the model’s integrated reading–writing–self-regulation structure but require fewer printed resources. Finally, the study’s focus on reading instruction, while justified by its foundational role in literacy, means that potential effects on writing-specific knowledge and efficacy remain unexplored.

Future investigations should prioritize longitudinal designs tracking participants into early teaching careers to assess sustained impacts. Research must also directly address the efficacy paradox by designing targeted supports (such as structured peer debriefing or cognitive coaching) integrated within SRSD Plus enactment. Replication across varied linguistic contexts is essential, and future work should examine impacts on participants’ actual classroom practices and student outcomes.

VII. CONCLUSION

Despite the constraints, this study illuminates the impact of the SRSD Plus framework on preservice primary teachers, particularly in accelerating their content knowledge for teaching reading. The research underscores the potential of reading-writing instruction models to deepen pedagogical understanding, marking a significant stride in literacy teacher training. Notably, this investigation stands among the first to shift focus from student outcomes to the developmental trajectory of educators within the SRSD paradigm. The findings reveal that teachers-in-training engaged in delivering the consolidated instruction ended up having worthwhile growth in their pedagogical content knowledge. Nonetheless, the intervention also uncovers a counterintuitive dip in self-efficacy beliefs among the student teachers, hinting at the challenges inherent in mastering multifaceted instructional approaches. This phenomenon may reflect a critical phase in professional development, where heightened awareness of instructional complexities temporarily dampens confidence, even as competence grows. This research contributes to the broader discourse on teacher education, advocating for a balanced approach that integrates rigorous instructional models with robust mentoring and reflective practices. It suggests that while sophisticated frameworks can yield pedagogical knowledge, they also necessitate intentional scaffolding to help novice educators navigate the complexities of their evolving practice. The journey toward effective literacy instruction is complicated, and this study provides a vital stepping stone in that ongoing quest.

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Author Contribution

Conceptualization, A. T., K. Y., and G. M.; methodology, A. T. and Z. Z.; software, A. T. and A. Y.; validation, A. T., K. Y., and G. M.; formal analysis, A. T.; investigation, A. T. and A. Y.; resources, K. Y.; data curation, A. T.; writing—original draft preparation, A. T., G. M., and A. Y.; writing—review and editing, K. Y., Z. Z., and G. M.; visualization, A. T.; supervision, Z. Z.; project administration, A. T. and K. Y.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data are available from the authors upon reasonable request.

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Appendix

Bayesian statistics differs from traditional (frequentist) statistics by combining prior information with new evidence to update beliefs about a quantity of interest. This process follows Bayes' theorem, which mathematically expresses how prior beliefs are adjusted in light of observed data. For example, predicting whether a bus will arrive on time can start with a prior belief based on long-term punctuality records (e.g., usually on time 80% of the days). Observing that heavy traffic is present today serves as new evidence, leading to an updated probability that the bus will arrive on time, which may now be lower. The updated belief, called the posterior distribution, represents the most current estimate given both the prior information and the new data.

A 95% credible interval is then derived from this posterior distribution. It represents the range of values most consistent with both the prior information and the observed evidence. Returning to the bus example, if the posterior distribution for the bus's delay time has a 95% credible interval of 5 to 12 minutes, it means there is a 95% probability that the true delay lies between 5 and 12 minutes. Unlike a frequentist confidence interval, which refers to the performance of a method over repeated sampling, a Bayesian credible interval can be interpreted directly as the probability of the value falling within the range.