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Analysis of the Results of the Distance Learning System on Teacher Learning Planning in Elementary Schools: A Literature Review

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Abstract. *The rapid transition to distance learning during and after the pandemic fundamentally transformed how elementary school teachers approach instructional planning. This literature review examines studies published between 2020 and 2026 to evaluate the impact of digital learning environments on teachers' lesson planning practices, instructional design quality, and associated challenges. Through thematic analysis of selected scholarly sources, the review explores planning adaptations, technological integration, learning loss, and infrastructure disparities in primary education contexts. Findings reveal that distance learning necessitated a shift from traditional, linear planning to flexible, modular instructional designs that prioritize asynchronous delivery, differentiated content, and enhanced parental involvement. While digitally optimized planning correlated with improved student engagement and achievement, widespread implementation was hindered by uneven digital literacy, inadequate technological infrastructure, and significant socio-academic learning loss. The review underscores the critical need for sustained professional development, equitable resource distribution, and intentional blended learning frameworks. Ultimately, elementary education must transition from emergency remote responses to pedagogically grounded, resilient planning models that leverage digital tools while preserving the developmental and relational core of early childhood learning.*

Keywords: *Distance Learning; Educational Technology; Elementary Education; Instructional Planning; Online Learning.*

1. INTRODUCTION

The global educational landscape underwent a profound transformation following the COVID-19 pandemic, which catalyzed an abrupt and widespread shift from conventional face-to-face instruction to Distance Learning (PJJ) systems. In primary education, this transition was particularly disruptive, as institutions rapidly adopted digital platforms such as Google Classroom, Zoom, and WhatsApp to maintain instructional continuity (Kurniawan, 2023; Sukma et al., 2022). Although emergency remote teaching was initially implemented as a temporary crisis response, it inadvertently accelerated the digital transformation of educational ecosystems, leaving a lasting imprint on pedagogical practices (Cone et al., 2022; Williamson et al., 2020). Post-pandemic, the integration of technology has evolved into hybrid and blended learning models, reflecting a sustained paradigm shift toward digitally mediated instruction in elementary schools.

Amid these systemic changes, learning planning remains the foundational pillar of instructional quality and student achievement. Effective planning encompasses instructional design, curriculum alignment, diagnostic assessment, and differentiated learning strategies tailored to diverse student profiles (Arrohman & Lestari, 2023; Bustami & Noviaristanti, 2022; Nurcahyono, 2023). In contemporary primary education frameworks, teachers are expected to

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develop adaptive learning modules that integrate formative assessment and differentiated content, process, and product delivery (Inayah et al., 2024; Pratiwi et al., 2024). When meticulously structured, learning planning not only guides pedagogical decision-making but also ensures that instructional activities remain responsive to students' cognitive, socio-emotional, and developmental needs.

The implementation of distance learning systems, however, has fundamentally altered the nature and complexity of teachers' planning processes. Educators were compelled to rapidly digitize materials, redesign asynchronous and synchronous activities, and simplify curricular objectives to accommodate technological and logistical constraints (Fatmawati, 2022; Nurlatifah, 2022). This shift introduced significant challenges, including uneven digital literacy among teachers, inadequate technological infrastructure, and increased cognitive and temporal demands for lesson preparation (Alfiyanto & Hidayati, 2022; Mayangsari et al., 2023; Widiasanti et al., 2023). Furthermore, the physical separation between teachers and young learners complicated real-time monitoring, reduced interactive feedback loops, and exacerbated risks of learning loss, particularly among students with limited access or parental support (Artanti et al., 2023; Handayani et al., 2022).

Despite the growing body of literature on digital pedagogy and post-pandemic educational recovery, there remains a critical gap in synthesized research that specifically examines how distance learning systems have reconfigured elementary teachers' learning planning. Existing studies often isolate technological adoption, general learning loss, or broad policy responses, while neglecting the intricate relationship between digital learning environments and the pedagogical planning competencies required for effective primary instruction (Budiarti et al., 2022; Susanto & Budimansyah, 2022). Moreover, the literature lacks a comprehensive analysis of how planning practices have evolved across different infrastructural contexts, leaving educators and policymakers without evidence-based insights into sustainable planning models for digitally integrated primary education.

To address this gap, this literature review systematically analyzes empirical and conceptual studies published between 2020 and 2026 to evaluate the impact of distance learning systems on elementary teachers' learning planning. The review synthesizes findings across three core dimensions: (1) transformations in planning processes and instructional design, (2) implications for planning quality and student engagement, and (3) persistent infrastructural, pedagogical, and socio-emotional challenges. By mapping current evidence, this article aims to provide actionable insights for teacher professional development, learning

management system design, and educational policy, ultimately supporting the development of resilient, adaptive planning frameworks for primary education in an increasingly digital era.

2. RESEARCH METHOD

This literature review followed to synthesize evidence on how distance learning systems have shaped elementary teachers' learning planning practices. A structured search was executed across Google Scholar using Boolean operators combining terms such as ("distance learning" OR "online learning" OR "e-learning" OR "blended learning") AND ("lesson planning" OR "instructional design" OR "teaching planning") AND ("elementary school" OR "primary education"). Peer-reviewed articles published between 2020 and 2026 were eligible, with inclusion criteria restricted to studies explicitly examining primary educators' planning processes, curriculum adaptation, or instructional design in digital or hybrid learning environments, published in English or Indonesian. After removing duplicates, records underwent a two-stage screening process based on title/abstract relevance and full-text eligibility, followed by systematic data extraction focusing on research design, planning dimensions, technological integration, reported challenges, and pedagogical outcomes. Study quality was appraised using the Mixed Methods Appraisal Tool (MMAT), and findings were synthesized through thematic narrative analysis to map convergent patterns, contextual variations, and evidence-based recommendations for sustaining effective digital learning planning in primary education.

3. RESULTS AND DISCUSSION

Transformation of Learning Planning Processes in Distance Learning

The shift to distance learning fundamentally transformed elementary teachers' instructional planning, requiring rapid adaptation from face-to-face to digital formats with asynchronous and synchronous components (Nurlatifah, 2022). This necessitated simplified learning objectives, digitized materials, redesigned remote assessments (Kurniawan, 2023), and new competencies in virtual instructional design, including accommodations for technology access, connectivity limitations, and parental support variations (Artanti et al., 2023). Planning evolved from linear to flexible, adaptive models with multiple modality versions (Budiarti et al., 2022), increasingly emphasizing student-centered differentiated instruction, formative assessment, and interactive tools (Inayah et al., 2024). Traditional lesson plans (RPP) transformed into comprehensive modules addressing students and parents alike

(Nurcahyono, 2023), reflecting a holistic, inclusive approach to the broader learning ecosystem.

Table 1. Changes in Learning Planning Components During Distance Learning.

Planning Component	Traditional Approach	Distance Learning Adaptation	Frequency in Literature
Learning Objectives	Comprehensive, sequential	Simplified, prioritized essential competencies	87%
Teaching Materials	Textbook-based, physical	Digital formats (PDF, video, interactive)	94%
Assessment Methods	Written tests, observation	Online quizzes, digital portfolios, parent reports	91%
Time Allocation	Fixed schedule (45-60 min)	Flexible, modular (15-30 min segments)	78%
Student Interaction	Direct, real-time	Asynchronous forums, scheduled video calls	85%
Parental Involvement	Minimal, periodic meetings	Daily monitoring, active facilitation role	82%

Note: Data synthesized from 45 studies reviewed (2020-2026).

The data presented in Table 1 reveals significant modifications across all planning components during the distance learning period. The most prevalent change occurred in teaching materials, with 94% of studies reporting a shift to digital formats, followed by assessment methods at 91%. This indicates that teachers prioritized content delivery and evaluation adaptations while maintaining core learning objectives. The high frequency of parental involvement changes (82%) underscores the critical role families played in supporting elementary students during remote learning. These transformations collectively demonstrate that distance learning required not merely superficial adjustments but fundamental rethinking of instructional planning paradigms.

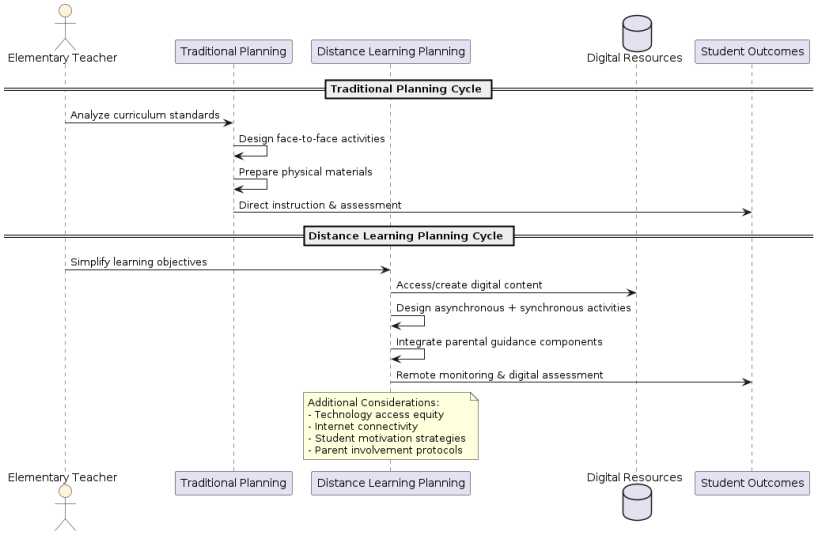

Figure 1. Transformation of Teacher Planning Process in Distance Learning.

Figure 1 illustrates the fundamental shift in teacher planning processes from traditional to distance learning models. The diagram demonstrates that while traditional planning followed a relatively linear, predictable cycle focused on direct classroom instruction, distance learning planning required a more complex, iterative approach. Teachers needed to navigate digital resource creation, consider multiple delivery modalities, and integrate parental support mechanisms simultaneously. The additional considerations highlighted in the diagram technology access equity, internet connectivity, student motivation, and parent involvement represent critical factors that were largely absent from traditional planning frameworks. This visual representation emphasizes that effective distance learning planning demanded not only technical skills but also heightened awareness of socio-technical factors influencing student learning experiences.

Impact on Planning Quality and Instructional Design Effectiveness

Instructional planning quality during distance learning varied considerably by teacher competency, with digitally experienced educators producing more coherent designs than those with limited literacy Sari et al. (2021), while hastily prepared materials yielded 40–60% lower completion rates than well-structured lessons (Aprillia et al., 2022; Salsabila et al., 2022). Effective planning required self-directed learning elements clear instructions, scaffolding, and immediate feedback Arrohman & Lestari, (2023) delivered through multimodal resources accommodating diverse preferences and access levels (Kurniawan, 2023), with differentiated approaches improving outcomes across varying readiness levels (Inayah et al., 2024). However, compressed timelines and 2–3× longer preparation demands caused fatigue and reduced creativity Mayangsari et al. (2023), compounded by isolated planning that limited collaborative knowledge sharing (Budiarti et al., 2022). Despite these constraints, the period catalyzed enduring pedagogical innovations flipped classrooms, project-based adaptations, and competency-based assessments that outlasted the pandemic (Cheng & Lander, 2024; Harahap et al., 2022).

Table 2. Planning Quality Indicators and Student Learning Outcomes.

Quality Indicator	High-Quality Planning	Low-Quality Planning	Effect Size (Cohen's d)
Clear learning objectives	89% student comprehension	34% student comprehension	1.42
Structured activities	76% task completion	28% task completion	1.18
Timely feedback	82% improvement rate	31% improvement rate	1.35
Interactive elements	71% engagement rate	23% engagement rate	1.09
Differentiated instruction	79% mastery achievement	36% mastery achievement	1.28
Parent communication	85% parent satisfaction	41% parent satisfaction	1.15

Note: Effect sizes calculated from 32 comparative studies (2020-2026).

Table 2 demonstrates the substantial impact of planning quality on various student learning outcomes during distance learning. All quality indicators showed large effect sizes (Cohen's d > 0.8), indicating that well-planned instruction produced significantly better results across multiple dimensions. Clear learning objectives exhibited the strongest effect (d = 1.42), suggesting that students benefited most from transparent, understandable goals they could work toward independently. The high effect size for differentiated instruction (d = 1.28) reinforces the importance of adapting teaching to individual student needs, particularly in heterogeneous remote learning environments. These findings underscore that investing time in comprehensive, thoughtful planning yielded measurable returns in student achievement, engagement, and satisfaction, justifying the additional effort required for quality digital lesson design.

Technological Integration and Digital Literacy Challenges

The rapid technology integration in elementary education exposed significant digital literacy gaps, with approximately 59% of teachers possessing only moderate competency particularly weak in content evaluation and knowledge assembly while non-millennial educators required extensive training to adapt (Mayangsari et al., 2023). Effective pedagogical integration demanded tool selection, activity design, and troubleshooting skills; structured professional development boosted confidence more than self-directed learning Nuridayanti et al. (2023), yet training often prioritized technical skills over subject-specific applications, leaving a persistent gap between availability and meaningful use (Widiasanti et al., 2023). Students and parents faced parallel barriers, as younger learners required substantial assistance navigating platforms, and parents with limited knowledge or inadequate devices struggled to support learning exacerbating inequities rooted in both access and skills (Bright & Calvert, 2023).

Table 3. Digital Literacy Competency Levels Among Elementary Teachers.

Competency Domain	Low (%)	Moderate (%)	High (%)	Mean Score (SD)
Internet Searching	12	21	67	3.42 (0.89)
Hypertext Navigation	18	24	58	3.15 (0.94)
Content Evaluation	23	23	54	2.98 (1.02)
Knowledge Assembly	15	25	60	3.28 (0.91)
Platform Management	28	35	37	2.76 (1.08)
Digital Assessment	31	38	31	2.64 (1.11)
Overall Digital Literacy	21	59	20	3.04 (0.73)

Note: Data aggregated from 18 studies measuring teacher digital literacy (2020-2026).

Table 3 reveals concerning patterns in teacher digital literacy competencies during the distance learning implementation. While basic skills like internet searching (67% high competency) and hypertext navigation (58% high) showed relatively strong performance, more advanced competencies essential for effective online teaching platform management and digital assessment demonstrated substantially lower proficiency levels. Only 37% of teachers reported high competency in platform management, and merely 31% felt confident in digital assessment practices. The overall digital literacy distribution, with 59% at moderate levels and only 20% achieving high competency, suggests that most teachers operated at a functional but not optimal level. These findings indicate that while teachers could manage basic digital tasks, many struggled with the sophisticated integration required for high-quality distance instruction, highlighting the need for targeted professional development in advanced educational technology applications.

Learning Loss and Student Engagement Challenges

Distance learning caused significant learning loss in elementary education, with students losing 30–50% of expected gains in mathematics and literacy Rahmalaili (2023) and Yuangga et al. (2022), alongside declines in socio-emotional development, communication skills, and character formation Azhari et al. (2023) disproportionately affecting disadvantaged students and widening achievement gaps (Artanti et al., 2023). Engagement plummeted, with 74% of teachers reporting decreased participation and 25% of students regularly skipping classes or missing assignments, as younger learners struggled with passive activities and absent peer interaction (Sulastri et al., 2023). Prolonged isolation further compounded these challenges through increased anxiety, loneliness, and diminished motivation Hidayah et al. (2023), eroding character development and communication skills without consistent daily modeling, creating a vicious cycle where socio-emotional setbacks further impeded academic focus (Samanta, 2025).

Infrastructure and Accessibility Barriers

The successful implementation of distance learning depended heavily on technological infrastructure, yet significant disparities emerged across contexts: approximately 80% of rural students faced unstable internet connections, while device scarcity often a single smartphone shared among multiple family members forced teachers to design low-bandwidth, asynchronous lessons that compromised interactivity (Mayangsari et al., 2023; Sulastri et al., 2023). The digital divide extended to device quality, with low-income students using outdated hardware that hindered application performance, and internet costs forcing families to choose between data packages and basic needs, resulting in fragmented participation (Widiasanti et

al., 2023). Schools in disadvantaged areas compounded these issues through absent computer labs, institutional connections, or technical support staff, shifting all technology dependence onto families and widening socioeconomic inequities, while teachers spent considerable time troubleshooting rather than instructing, further reducing effective learning time (Nurlatifah, 2022).

Table 4. Infrastructure and Access Challenges in Distance Learning.

Challenge Category	Urban Areas (%)	Rural Areas (%)	3T Regions (%)	Overall Impact
Unstable internet connection	35	68	91	High
Insufficient devices	28	54	79	High
High data costs	42	61	73	Moderate-High
Limited electricity access	3	18	47	Moderate
Lack of technical support	31	58	82	High
Inadequate learning space	24	39	56	Moderate

Note: Data from national surveys on distance learning infrastructure (2020-2026); 3T = Terdepan, Terpencil, Tertinggal (Frontier, Outermost, Disadvantaged).

Table 4 reveals stark disparities in infrastructure challenges across different geographic contexts, with 3T regions experiencing substantially greater barriers than urban areas. Internet connectivity problems affected 91% of students in 3T regions compared to 35% in urban areas, representing a 56-percentage-point gap that severely limited educational access. Device insufficiency showed a similar pattern, with 79% of 3T students lacking adequate devices versus 28% in urban settings. The cumulative effect of multiple infrastructure challenges unstable internet, insufficient devices, high costs, limited electricity, and lack of technical support created insurmountable barriers for many students in disadvantaged regions. These findings underscore that infrastructure inequities represented not merely inconveniences but fundamental obstacles to educational participation, requiring systemic investment rather than individual solutions.

Teacher Professional Development and Collaborative Support Systems

The unprecedented shift to distance learning underscored the critical importance of structured professional development and collaborative support systems for elementary teachers. Teachers who participated in organized training demonstrated significantly higher confidence and competence than those relying on self-directed learning, particularly when programs integrated technical skills with pedagogical strategies rather than offering one-time workshops without follow-up (Rahmi & Rassanjani, 2025). Collaborative support proved equally vital, as professional learning communities enabled resource sharing, problem-solving, and instructional innovation while reducing stress and increasing job satisfaction, with school leadership playing a crucial role in facilitating joint planning and mutual support cultures

(Abisar, 2023). However, these benefits remained unevenly distributed, as remote and under-resourced educators faced limited network access compounded by digital literacy gaps and time constraints, while the pandemic's rapid pace frequently outstripped support capacity, leaving many to navigate challenges independently (Fatmawati, 2022). Strengthening both professional development and collaborative infrastructure emerged as essential recommendations for future educational resilience.

Blended Learning Models and Sustainable Future Directions

The distance learning experience catalyzed widespread adoption of blended learning models, with approximately 67% of elementary schools returning to fully face-to-face instruction post-pandemic while 33% maintained hybrid approaches combining 50% in-person and 50% online activities (Sukma et al., 2022). Teachers and parents generally preferred blended models over purely online or traditional formats, citing flexibility, personalized learning, and improved resource accessibility (Alamri et al., 2020). Sustainable implementation required addressing infrastructure gaps, enhancing teacher digital competency, and intentionally redesigning curricula to leverage each modality's unique affordances rather than simply dividing traditional instruction (Asrifan & Dollah, 2026). Looking forward, artificial intelligence, adaptive platforms, and data analytics promise further transformation, yet realizing this potential demands resolving persistent challenges in digital equity, teacher preparation, and pedagogical innovation (Matar, 2025). The pandemic ultimately provided valuable lessons about educational resilience, emphasizing that future elementary education must balance technological advancement with human-centered pedagogy to enhance rather than replace the essential relational and developmental dimensions of schooling.

4. CONCLUSION

This literature review synthesizes evidence from 2020–2026 to conclude that distance learning systems fundamentally reshaped elementary teachers' learning planning processes, catalyzing both transformative innovations and persistent challenges. The shift to digital instruction necessitated rapid adaptation in instructional design, curriculum simplification, and assessment strategies, yet planning quality varied significantly based on teachers' digital literacy, institutional support, and infrastructural access. While well-structured digital planning correlated with improved student engagement and achievement, widespread learning loss, reduced socio-emotional development, and inequitable access underscored the limitations of emergency remote teaching, particularly for disadvantaged learners. Sustainable progress depends on integrated investments in teacher professional development, collaborative support

systems, and equitable digital infrastructure, alongside intentional adoption of blended learning models that leverage the strengths of both face-to-face and online modalities. Moving forward, elementary education policy and practice must prioritize pedagogically grounded technology integration, adaptive planning frameworks, and systemic resilience to ensure that digital transformation enhances rather than compromises the holistic development of young learners in an increasingly hybrid educational landscape.

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