

Blended Learning in Brunei's Preschool Education: Innovations, Challenges, and Policy Implications

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Abstract— Blended learning, which combines face-to-face and online instruction, gained prominence globally during the COVID-19 pandemic as education systems sought continuity amid school closures. In Brunei Darussalam, blended approaches were introduced across all levels of education, including preschool, where play-based learning and parental involvement are central. However, despite growing adoption, there remains limited literature examining the role, challenges, and developmental appropriateness of blended learning in early childhood education (ECE). This article reviews and analyses existing research, policy documents, and contextual reports related to blended learning in Brunei's preschool sector, situating the discussion within national priorities such as Wawasan 2035 and the Sistem Pendidikan Negara Abad ke-21 (SPN21). The review identifies innovative practices, including digital storybooks, video-based lessons, interactive home activities, and the use of television and radio programmes to support learning continuity. It also highlights key challenges, such as unequal access to technology, varying parental capacity, limited teacher preparedness for digital pedagogy, and concerns about screen time and child well-being. The analysis suggests that blended learning can enrich preschool education when it is developmentally appropriate, play-oriented, and supported by adults, but it should function as a complement rather than a substitute for face-to-face learning. Policy implications emphasise investment in infrastructure, teacher professional development, and structured parental support to ensure equitable and sustainable implementation.

Keywords: *Blended learning, Brunei Darussalam, Early Childhood Education, Educational Technology, Parental Involvement*

I. INTRODUCTION

Blended learning, commonly defined as the purposeful integration of face-to-face and online learning experiences, has gained global attention over the past decade and became particularly prominent during the COVID-19 pandemic. Worldwide school closures forced education systems to adopt online and home-based learning models as emergency measures to ensure continuity of education (Haidi & Hamdan, 2023). While this rapid shift accelerated the adoption of digital technologies across educational levels, it also exposed longstanding issues related to infrastructure, digital literacy, and pedagogical readiness.

In Brunei Darussalam, the impact of the pandemic was felt across all sectors of education, including preschool. In early 2020, all schools were closed for approximately two months, during which teaching and learning continued through home-based online approaches. A second nationwide closure in August 2021 again required preschools to transition to remote and blended modes of instruction. These disruptions highlighted both the potential and the limitations of digital learning for young children. Issues such as uneven internet access, limited availability of digital devices, varying parental capacity to support learning at home, and teachers' readiness to design developmentally appropriate online activities became particularly visible at the preschool level.

Globally, blended learning has been discussed not only as an emergency response but also as a longer-term educational strategy. Studies in primary, secondary, and higher education contexts suggest that blended learning can enhance flexibility, promote learner engagement, and support the development of digital literacy skills. However, the application of blended learning in early childhood education remains underexplored. Preschool education differs fundamentally from other levels of schooling due

to its emphasis on play-based pedagogy, social interaction, and adult mediation. Young children have limited capacity for independent online engagement, making parental involvement and teacher guidance essential components of any blended approach.

In Brunei, preschool education caters to children aged approximately three to five years and prioritises holistic development through play, early literacy and numeracy, bilingual instruction, and the inculcation of moral and cultural values. These priorities align with national education policies, including the Sistem Pendidikan Negara Abad ke-21 (SPN21) and the long-term national vision, Wawasan 2035, which emphasise innovation, ICT integration, and strong home–school partnerships. Within this policy context, blended learning has been increasingly discussed as a potential means of enhancing resilience, supporting parental engagement, and preparing young learners for a digital future, while still safeguarding their developmental needs.

Despite growing interest, there is limited literature that critically examines how blended learning operates within preschool settings in Brunei or similar contexts. Existing studies often focus on older learners or treat early childhood education as an extension of primary schooling, without sufficient attention to play-based pedagogy, cultural grounding, or the role of families. This article addresses this gap by reviewing and analysing existing literature and policy documents related to blended learning in Brunei’s preschool education. Specifically, it explores how blended learning has been implemented, the innovations that emerged during and after the pandemic, the challenges encountered, and the implications for policy and practice. The article is organised as follows: the next section defines blended learning within early childhood education, followed by a discussion of Brunei’s preschool context and pandemic response. Subsequent sections examine blended learning strategies, challenges, and policy implications before concluding with recommendations for future practice.

II. METHODOLOGY

This article employs a narrative literature review approach to examine blended learning in preschool education within the context of Brunei Darussalam. A narrative review was selected because the purpose of the study is to synthesise, interpret, and contextualise existing research and policy literature rather than to evaluate intervention effectiveness or conduct a systematic comparison of empirical outcomes.

Relevant literature was identified through searches of academic databases such as Google Scholar and Scopus, as well as institutional and policy sources, including reports from the Ministry of Education and regional organisations. Keywords used in the search process included blended learning, early childhood education, preschool, parental involvement, online learning, COVID-19, and Brunei Darussalam. The review focused on peer-reviewed journal articles, regional studies, and policy documents published between 2004 and 2024 that addressed blended or online learning in early childhood or closely related educational contexts.

The selected literature was analysed thematically, with particular attention to recurring patterns related to (a) pedagogical strategies and innovations, (b) parental involvement and home–school partnerships, (c) technological and infrastructural challenges, and (d) policy and professional development implications. This analytical process enabled an integrative understanding of how blended learning has been conceptualised and implemented in preschool settings, particularly during periods of educational disruption, while also highlighting contextual considerations relevant to Brunei’s early childhood education system.

III. DEFINING BLENDED LEARNING IN EARLY CHILDHOOD EDUCATION

Blended learning is commonly defined as an instructional approach that purposefully integrates face-to-face teaching with online or digital learning experiences. Garrison and Kanuka (2004) describe blended learning as the thoughtful fusion of physical and virtual learning environments in ways that leverage the strengths of both modalities. Rather than treating online and in-person learning as separate or competing modes, blended learning emphasises deliberate pedagogical design in which each mode complements the other.

In early childhood education (ECE), however, the concept of blended learning requires careful reinterpretation. Preschool children learn primarily through play, social interaction, and hands-on exploration, and they have limited capacity for sustained attention or independent engagement with digital technologies. As a result, blended learning in ECE cannot simply replicate models used in primary, secondary, or higher education. Instead, digital components must be short, highly interactive, visually engaging, and closely mediated by adults. Research suggests that when digital tools are developmentally appropriate and integrated into play-based pedagogy, they can enrich young children's learning experiences rather than detract from them (Undheim & Jernes, 2020).

An important consideration in defining blended learning for preschool contexts is the issue of screen time. The World Health Organization (2019) recommends that sedentary screen time for children aged two to four years should not exceed one hour per day, with less being preferable. These guidelines highlight the need for blended learning approaches that prioritise quality over quantity in digital engagement. In practice, this may involve brief online interactions, such as storytelling or sing-along sessions, followed by offline activities that encourage movement, creativity, and social interaction.

Parental involvement is another defining feature of blended learning in early childhood education. Unlike older learners, preschool children depend on caregivers to access digital platforms, interpret instructions, and extend learning beyond the screen. Studies on home-based and blended learning during the COVID-19 pandemic indicate that parents play a crucial mediating role, supporting children's engagement and reinforcing learning through everyday activities (Dong et al., 2020). In this sense, blended learning in ECE operates within a triadic relationship involving teachers, children, and parents, where digital tools function as a means of connection rather than as stand-alone instructional resources.

Taken together, blended learning in early childhood education can be understood as a carefully planned integration of face-to-face, play-based pedagogy with limited and purposeful use of digital technologies, supported by active adult mediation. When designed in this way, blended learning has the potential to extend learning across home and school contexts while remaining aligned with young children's developmental needs.

IV. BRUNEI'S PRESCHOOL EDUCATION CONTEXT AND RESPONSE TO COVID-19

Preschool education in Brunei Darussalam, locally referred to as prasekolah, serves children aged approximately three to five years and is grounded in play-based, child-centred pedagogy. Learning experiences emphasise early literacy and numeracy, socialisation, moral development, and bilingual instruction in Malay and English. These practices are shaped by national educational philosophies, including the principles of Melayu Islam Beraja (MIB), as well as policy frameworks such as SPN21, which emphasise holistic development, innovation, and the integration of information and communication technologies.

Prior to the COVID-19 pandemic, the use of digital technologies in Bruneian preschools was relatively limited. Technology was typically used to supplement teaching through short educational videos, digital slides, or basic computer activities, while the core of preschool learning remained firmly rooted in face-to-face interaction, songs, storytelling, and hands-on play. This emphasis reflected widely held views about developmental appropriateness in early childhood education.

The closure of schools in early 2020 marked a significant shift in practice. As part of national public health measures, all schools, including preschools, were closed for approximately two months, and teaching continued through home-based online learning. Teachers were required to prepare learning materials for remote delivery using platforms such as Google Classroom and WhatsApp, while parents assumed a much more active role in facilitating children's daily learning. This period represented an unprecedented change in the structure of preschool education in Brunei, as formal learning became heavily reliant on family support.

Following the reopening of schools in mid-2020, Brunei experienced a period of relative educational stability until a second wave of COVID-19 in August 2021 prompted another nationwide closure. Once again, preschools transitioned to online and blended modes of instruction, highlighting both the resilience of educators and the persistent challenges associated with remote learning for young children. During this time, issues such as uneven internet connectivity, limited access to digital devices, and teachers' varying levels of preparedness for online pedagogy became more pronounced, particularly in rural areas such as Temburong (Haidi & Hamdan, 2023).

In response to these challenges, the Ministry of Education implemented several support measures. These included professional development initiatives led by the Brunei Darussalam Teacher Academy (BDTA) to enhance teachers' digital pedagogical skills, as well as the use of television and radio programmes to support learning continuity for families with limited internet access. Helplines were also established to provide technical and emotional support to parents and children. Collectively, these measures reflected an emerging recognition that effective blended learning requires coordinated support at the institutional, community, and family levels.

Brunei's relatively swift return to face-to-face schooling, compared with some neighbouring countries, underscored the recognised importance of in-person learning for early childhood development. At the same time, the pandemic experience prompted ongoing discussions among educators, parents, and policymakers about whether selected digital practices should be retained beyond crisis periods. These discussions now inform broader considerations of how blended learning might be integrated into preschool education in ways that are developmentally appropriate, culturally grounded, and aligned with national goals.

V. LESSONS LEARNED FOR FUTURE CRISES

The experiences of Brunei's preschool sector during the COVID-19 pandemic offer several important lessons for strengthening the resilience of early childhood education in the face of future disruptions. First, the crisis highlighted the critical role of parents as learning partners. While teachers remained the primary designers of learning activities, the actual implementation at home depended heavily on parental involvement. Many families rose to the challenge, but others struggled due to work commitments, limited digital skills, or household constraints. This demonstrates the need for systematic parent-engagement programs that equip caregivers with the knowledge, confidence, and practical strategies to support learning whenever school closures occur.

Second, the pandemic revealed that digital readiness must extend to the preschool level, not only to secondary or tertiary education where technology integration is often emphasized. Preschool teachers require specialized training in creating short, engaging, and developmentally appropriate digital

activities. In addition, resource banks containing localized multimedia materials such as interactive Malay and English storybooks, culturally relevant songs, and simple at-home experiments should be developed and made easily accessible. These resources could serve as ready-to-use toolkits during emergencies and reduce the burden on individual teachers.

Third, the crisis demonstrated the value of multi-platform approaches. While online tools such as Google Classroom and WhatsApp were useful, reliance on them alone excluded families without stable internet or multiple devices. The Ministry of Education's use of television and radio programming proved effective in broadening access and should remain part of future emergency learning strategies. Combining high-tech, low-tech, and no-tech solutions ensures that children from all socio-economic backgrounds can continue to learn.

Finally, the pandemic underscored the importance of policy planning and preparedness. Brunei's relatively swift return to face-to-face schooling minimized learning loss, but the uncertainty of repeated closures revealed the need for structured contingency plans. Developing a clear framework for preschool blended learning, including screen time guidelines, teacher training pathways, and parental support systems would ensure that Brunei is better prepared for future crises, whether health-related or environmental.

VI. BLENDED LEARNING STRATEGIES AND INNOVATIONS IN BRUNEIAN PRESCHOOLS

This The literature indicates that effective blended learning strategies in preschool education rely on creative pedagogical design that aligns digital tools with young children's developmental characteristics. Rather than replicating conventional classroom instruction in online formats, educators have adopted approaches that emphasise interactivity, brevity, and integration with hands-on activities. These strategies recognise that preschool children engage most meaningfully with learning when digital content is embedded within play-based and socially mediated experiences.

One prominent innovation identified in the literature is the use of digital storytelling. Undheim and Jernes (2020) highlight how digital stories, incorporating animations, narration, and interactive elements, can sustain young children's attention while supporting language development. In the Bruneian context, studies such as Yusli and Zainal (2023) demonstrate that interactive digital storybooks enhanced preschool children's engagement and positive attitudes toward learning during periods of online instruction. Importantly, these digital resources functioned most effectively when used as shared activities between teachers, children, and parents, reinforcing learning through dialogue and play rather than passive screen consumption.

Video-based lessons also emerged as a commonly adopted strategy. Teachers recorded short videos featuring storytelling, sing-alongs, or demonstrations of simple activities using household materials. These videos provided flexibility for families to engage with learning at convenient times while maintaining children's familiarity with their teachers. When paired with offline follow-up activities, such as drawing, role play, or craft work, video-based instruction supported continuity between online and face-to-face learning environments.

Synchronous online sessions, where implemented, were typically kept brief and highly interactive. Activities such as greetings, show-and-tell, and simple movement-based games were used to maintain social connection and peer interaction. These practices align with international recommendations that online engagement for young children should be short in duration and focused on active participation. In several cases, teachers integrated these sessions with offline tasks to be completed at home and shared during subsequent interactions, reinforcing learning through repetition and social exchange.

In addition to internet-based tools, the use of broadcast media represented an important innovation in Brunei's blended learning response. Educational television and radio programmes developed by the Ministry of Education enabled learning continuity for families with limited internet access. These programmes also illustrated how low-tech and no-tech solutions can complement digital platforms, ensuring broader inclusion while supporting pedagogical goals.

Collectively, these strategies demonstrate that blended learning in preschool education can be effective when digital tools are deliberately integrated with play-based activities, parental involvement, and opportunities for social interaction. Rather than replacing face-to-face teaching, these innovations extend learning across home and school contexts, reinforcing children's experiences through multiple modes of engagement.

VII. CHALLENGES AND CONSIDERATIONS FOR BLENDED LEARNING IN PRESCHOOL

While blended learning offers potential benefits, the literature consistently highlights several challenges that must be addressed to ensure developmentally appropriate and equitable implementation in preschool settings. These challenges relate to parental involvement, infrastructure and access, teacher preparedness, children's well-being, and the availability of coherent policy support.

VI.1 Parental Involvement

Parental involvement emerged as a central factor influencing the effectiveness of blended learning in preschool education. Because young children are unable to independently navigate online learning environments, parents or caregivers act as mediators who facilitate access, provide guidance, and reinforce learning through everyday activities. Studies conducted during the COVID-19 pandemic indicate that while many parents were willing to support their children's learning, they often faced competing demands related to employment, household responsibilities, and limited digital skills (Haidi & Hamdan, 2023).

Differences in home environments further shaped children's learning experiences. Factors such as the availability of quiet learning spaces, access to devices, and the presence of supportive adults contributed to uneven participation and engagement. Without adequate support structures, blended learning risks amplifying existing inequalities, particularly for families with fewer resources. These findings highlight the need for clear guidance, practical resources, and communication strategies that empower parents as partners in preschool education rather than positioning them as substitute teachers.

VI.2 Infrastructure and Technological Access

Reliable access to digital infrastructure remains a prerequisite for blended learning. Although Brunei has relatively high national internet penetration, disparities persist across geographic regions and socio-economic groups. During periods of school closure, some families relied on shared mobile devices or experienced unstable internet connections, which limited children's participation in online activities. These infrastructural challenges were particularly evident in more remote districts, underscoring the uneven distribution of digital resources (Haidi & Hamdan, 2023).

Addressing these challenges requires a multi-pronged approach, including continued investment in broadband infrastructure, targeted support for families lacking devices, and the development of offline alternatives for learning. The use of television and radio programming during the pandemic illustrates the value of inclusive, multi-platform strategies that ensure learning continuity regardless of connectivity constraints.

VI.3 Teacher Preparedness and Professional Development

Teacher preparedness plays a critical role in determining the quality of blended learning experiences. Many preschool teachers entered the pandemic with limited training in digital pedagogy and had to rapidly acquire new skills related to online instruction, content creation, and virtual classroom management. While professional development initiatives were introduced to support teachers, the literature suggests that ongoing and specialised training remains necessary, particularly in designing developmentally appropriate digital content for young children.

Effective blended learning requires more than technical proficiency; it demands pedagogical understanding of how digital tools can support play, interaction, and learning. Teachers also face time constraints and increased workloads when developing customised digital materials. Establishing shared repositories of culturally relevant resources and encouraging collaboration among educators may help reduce individual burden while promoting consistency and quality.

VI.4 Maintaining Young Children's Engagement and Well-being

Young children thrive on movement, social interaction, and tactile exploration. A major concern in integrating blended learning into preschool education is the potential reduction of these essential experiences. Extended screen time can limit opportunities for play, peer interaction, and physical activity, which are foundational to early development. The World Health Organization (2019) cautions that children aged 2–4 should not exceed one hour of sedentary screen time daily, emphasizing instead activities such as reading, storytelling, or active play with caregivers.

In Brunei, teachers and parents expressed concerns during pandemic closures about children losing motivation and socialization opportunities. Online sessions often had to be kept under 20 minutes to maintain attention, and even then, some children became restless or disengaged. These challenges echo international findings where online preschool learning was described as “insufficient” for meeting holistic developmental goals (Evans et al., 2020).

To address this, blended learning in preschool must prioritize quality over quantity in online sessions. Activities should be interactive, movement-based, and preferably co-engaged with parents, for example, dance-along videos, scavenger hunts at home, or simple science experiments demonstrated on screen but carried out physically. Moreover, any digital component should connect directly to classroom reinforcement once children return, ensuring continuity rather than isolation between learning environments. Schools in Brunei could also establish clear guidelines on screen time limits and encourage parents to balance digital tasks with outdoor play and hands-on experiences. This integrated approach protects children's well-being while harnessing the benefits of digital tools.

VI.5 Child Well-being and Developmental Appropriateness

Concerns regarding young children's well-being feature prominently in discussions of blended learning. Extended or poorly designed screen time may limit opportunities for physical activity, social interaction, and sensory exploration, all of which are essential for early development. International guidelines, including those from the World Health Organization (2019), emphasise the importance of limiting sedentary screen time and prioritising active, play-based experiences.

The literature suggests that blended learning can support children's well-being when digital engagement is brief, interactive, and closely linked to offline activities. Movement-based tasks, creative play, and shared parent-child interactions help mitigate potential negative effects of screen exposure. These findings reinforce the importance of quality, balance, and adult mediation in designing blended learning experiences for preschool children.

VI.6 Policy and Structural Support

Sustainable implementation of blended learning in preschool education requires coherent policy and institutional support. Clear guidelines regarding screen time, curriculum integration, and expectations for parental involvement are necessary to support consistent practice across settings. During the pandemic, Brunei's policy responses demonstrated adaptability, but the literature indicates a need for more structured frameworks to guide blended learning beyond emergency contexts.

Policy initiatives could include pilot programmes to evaluate blended learning models, expanded professional development pathways for teachers, and mechanisms to support families facing digital or socio-economic barriers. Aligning blended learning initiatives with national priorities such as SPN21 and Wawasan 2035 ensures coherence with broader educational goals while safeguarding developmentally appropriate practice.

VIII. DISCUSSION AND POLICY IMPLICATIONS

The reviewed literature highlights that blended learning in Brunei's preschool education emerged primarily as a response to the COVID-19 pandemic but has since prompted broader reflection on the role of digital technologies in early childhood education. One key insight is that the relative success of blended learning initiatives was closely linked to teachers' adaptability and pedagogical creativity. Teachers who designed short, interactive activities such as digital storytelling, recorded demonstrations, and guided home-based tasks were better able to sustain children's engagement than those who relied on longer or more passive online sessions. This finding suggests that the effectiveness of blended learning in preschool contexts depends less on the technology itself and more on how it is pedagogically integrated.

Another important implication concerns play-based learning, which remains central to early childhood education. The literature indicates that blended learning can support play-based pedagogy when digital tools are used to extend, rather than replace, hands-on experiences. For example, digital storybooks and video demonstrations often served as prompts for offline activities such as drawing, role play, or simple experiments conducted at home. In this way, blended learning facilitated continuity between school and home while preserving opportunities for physical movement, exploration, and imaginative play.

Parental involvement emerged as a critical factor influencing the implementation of blended learning. In preschool settings, parents functioned as co-facilitators of learning, supporting children's participation in online activities and reinforcing learning through everyday routines. While many families engaged positively, the literature also highlights disparities in parental capacity due to work commitments, digital skills, and home learning environments. These findings underscore the need for structured parental support and clear guidance to ensure that blended learning does not exacerbate existing inequalities.

From a policy perspective, the findings reinforce the importance of positioning blended learning as a complement to face-to-face preschool education rather than a substitute. The holistic development of children encompassing cognitive, social, emotional, and physical domains, cannot be achieved through digital means alone. Policies should therefore support blended models that prioritise developmentally appropriate practices, clear screen time guidelines, and strong home-school partnerships. Investment in teacher professional development, particularly in early childhood digital pedagogy, and the development of culturally relevant digital resources are also essential to ensure sustainable and equitable implementation.

IX. CONCLUSION

This review has examined blended learning in Brunei's preschool education through a synthesis of existing literature and policy documents. The findings indicate that blended learning, when thoughtfully designed and supported, can enhance educational continuity, foster parental engagement, and introduce developmentally appropriate digital experiences for young children. Innovative practices such as digital storytelling, short video-based lessons, and multi-platform delivery approaches demonstrated potential to complement play-based pedagogy rather than replace it.

At the same time, the challenges identified in the literature underscore that blended learning in early childhood education requires careful planning and sustained support. Unequal access to technology, variations in parental capacity, teachers' preparedness for digital pedagogy, and concerns about children's well-being highlight the risks of uncritical or overly technology-driven implementation. These issues reinforce the importance of positioning blended learning as a complement to face-to-face preschool education, where hands-on interaction, social engagement, and play remain central.

From a policy perspective, the findings suggest that investment in infrastructure, targeted professional development for preschool teachers, and structured parental support are essential for equitable and sustainable implementation. Developing culturally grounded digital resources and adopting inclusive, multi-platform strategies can further support resilience in times of disruption while aligning with national educational priorities.

In conclusion, Brunei's experience illustrates that blended learning in preschool education is neither a temporary emergency response nor a wholesale replacement for traditional pedagogy. Instead, it represents a complementary approach that, when carefully aligned with developmental principles and policy frameworks, can strengthen early childhood education systems and contribute to future-ready learning environments.

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