HNUE JOURNAL OF SCIENCE
Educational Sciences 2025, Volume 70, Issue 5, pp. 81-90
This paper is available online at https://hnuejs.edu.vn/
DOI: 10.18173/2354-1075.2025-0092

SCALING BLENDED APPROACHES IN TEACHER PROFESSIONAL DEVELOPMENT: A MODEL FOR EMPOWERING TEACHERS IN UNDER-RESOURCED CONTEXTS

Nguyen Phuong Thao
Faculty of Geography, Hanoi National University of Education, Hanoi city, Vietnam

*Corresponding author: Nguyen Phuong Thao, e-mail: nguyenphuongthao@hnue.edu.vn

Received June 24, 2025. Revised August 4, 2025. Accepted August 12, 2025.

Abstract. Blended approaches, which typically combine technology-enhanced learning with in-person professional development, have gained traction in teacher professional development (TPD) as a scalable approach to improving teaching quality, particularly in under-resourced contexts. However, despite its promise, there remains a lack of integrated frameworks specifically designed to guide the sustainable and context-sensitive scaling of blended TPD. This paper proposes the SCALE-BTPD model which synthesizes key insights from existing scalability models and blended learning literature. The model consists of three interdependent layers: Enabling Conditions, Blended Learning Pathways, and an Iterative Scaling Mechanism. SCALE-BTPD reframes scale as a dynamic, equity-centered process rooted in local realities and teacher agency. It suggests practical guidance for policymakers, education leaders, and implementers seeking to design and scale blended TPD systems that are responsive, inclusive, and oriented toward long-term institutional change.

Keywords: blended approaches, teacher professional development (TPD), scale, education innovation.

1. Introduction

High-quality teacher professional development (TPD) is crucial for improving student learning outcomes. In recent years, online and blended models of TPD have gained traction for their potential to expand access, increase flexibility, and transform teacher learning through collaborative, technology-enhanced modalities [1-3].

Despite these advantages, especially in low- and middle-income contexts, the challenge of scaling and sustaining blended TPD remains a pressing concern in both research and practice. Many efforts fail to maintain quality, relevance, or impact as they expand, limiting long-term effectiveness [4]. Notably, in under-resourced contexts, several systemic challenges exacerbate these issues. First, human resource limitations such as the shortage of qualified mentors, facilitators, and instructional designers undermine the ability to localize, adapt, and sustain training content at scale [5]. Second, equity concerns persist across all levels of implementation. Teachers in remote or disadvantaged areas are often the least likely to benefit from TPD opportunities due to barriers related to language, culture, and geography [5]. These challenges highlight the urgent need for blended TPD models that are not only scalable but also flexible, context-responsive, and equity-oriented. While existing literature has begun to examine how

teacher learning extends beyond individual participants to influence broader educational communities [6-7], comprehensive frameworks for scalable and sustainable TPD remain underdeveloped. The increasing use of digital technologies offers new opportunities but also raises concerns related to the digital divide and unproven effectiveness [8-9].

This study, therefore, addresses the research question: How can blended TPD be scaled in a sustainable and context-sensitive manner in under-resourced education systems? By reviewing literature on blended TPD and scaling educational innovations, this paper proposes a conceptual model designed to be effective and sustainable in low-bandwidth, resource-constrained environments like Vietnam.

2. Content

2.1. Conceptualizing Scaling and Blended TPD

2.1.1. Defining Scale and Scaling in TPD Contexts

In education reform, scaling and sustaining evidence-based innovations have become central goals, particularly in the context of TPD. Early definitions of scaling focused on quantitative expansion, whereas contemporary views emphasize a dynamic process of diffusing innovations to create local ownership and sustain change [10-12]. Scaling today is understood as preserving core program elements while enabling local adaptation and long-term relevance. Sustainability refers to the continued use of effective practices and the retention of core pedagogical values after initial support is withdrawn [13-14]. It also entails building teacher capacity, fostering ownership, and ensuring that program impacts endure beyond pilot phases.

Improvement science provides a framework for addressing scaling challenges through iterative cycles of collaborative problem-solving grounded in real-world contexts [15]. It balances scientific rigor with contextual relevance, offering tools to refine and adapt interventions in ways that support both scale and sustainability. It also addresses persistent barriers to scaling such as low local capacity or resistance to external programs by promoting mutual adaptation and continuous learning. Despite recent advancements, the literature on scaling in education is still conceptually fragmented. There are multiple terms, inconsistent definitions, and varying theories which hinder learning across studies [16].

2.1.2. Blended approaches in TPD

The literature on blended learning in higher education has laid a crucial foundation for the development of blended approaches in TPD. Blended learning, also known as hybrid or mixed learning [17], commonly defined as integrating multiple instructional modalities. Widely accepted definitions describe it as a systematic combination of traditional face-to-face instruction and computer-mediated learning, with, in some classifications, 30–79% of content delivered online [18-19]. This approach facilitates interaction among learners, instructors, and resources in both physical and digital environments [20].

In the TPD context, blended learning is adapted to improve effectiveness, scalability, and accessibility. Graham [21] described it as an “element shared across communities of practice” (p. 6), fostering collaborative growth, while Goos et al. [3] defined it as enabling boundary crossing between face-to-face and digital environments. Blended TPD typically combines technology-enhanced learning with in-person professional development activities [22–24]. VVOB [25] offers an expanded definition of blended TPD as “a combination of in-person and remote TPD”, where remote learning may occur online or offline through SMS-based activities, phone calls, or printed materials. A typical blended TPD trajectory includes interconnected learning activities such as training sessions, coaching conversations, lesson observations with feedback, field visits, and workshops, delivered through multiple modalities and pedagogical strategies.

Best practices for blended TPD, as showcased in the TPD@Scale framework [26], typically include several key components: guided self-directed learning (via MOOCs, LMS, or offline media); face-to-face sessions for collaboration in Professional Learning Communities (PLCs); classroom application of new practices; context-sensitive design that considers local ICT infrastructure and uses alternative methods like SMS or radio where needed; and dedicated tutor/facilitator support.

As interpretations of blended learning continue to evolve, it is critical for educators and TPD providers to develop a shared understanding of its core principles. Clarity in these foundational concepts informs program design and strengthens teachers' readiness to engage meaningfully with blended learning environments [27]. Research also highlights how blended TPD aligns with adult learning principles: teachers appreciate opportunities for self-directed study while benefiting from social interaction and structured support [28]. In under-resourced contexts, blended TPD can expand access, offer flexibility, and help reduce costs [8]. The approach allows teachers to engage in self-directed study at their own pace while benefiting from collaborative structures like PLCs that foster peer support and contextual learning [5]. By aligning with adult learning principles offering autonomy, relevance, and ongoing support, blended TPD can provide a potentially scalable and sustainable model for enhancing teacher learning worldwide.

2.2. Insights into Frameworks for scaling educational innovations

A growing body of research has sought to understand how education innovations can be effectively scaled to promote deep, sustainable, and system-wide change. This section reviews the influential frameworks that illuminate different dimensions of scaling educational innovations. The frameworks reviewed below were purposefully selected based on their direct relevance to the challenges of scaling TPD, particularly in low-resource and technology-constrained settings. Together, they provide complementary perspectives that move beyond numerical reach to emphasize depth, sustainability, equity, contextual responsiveness, and institutional alignment.

2.2.1. Multidimensional Framework for Scale [11]

Coburn (2003) [11] redefines scale as a multidimensional construct that highlights the depth and ownership of reform, not just its diffusion. Her four key dimensions include: Depth, which refers to meaningful changes in teachers' beliefs, pedagogical knowledge, and instructional practices; Sustainability, which refers to reform's capacity to persist over time despite external pressures; Spread, which refers to expansion of reforms to new schools and educators, while maintaining integrity; Shift in Ownership, which refers to transfer of responsibility from external actors to local educators and institutions.

Based on Coburn's model, Dede [29] added the dimension "evolution", which is the "space" where the innovation as revised by its adapters is influential in reshaping the thinking of its designers, creating a community of practice that evolves the innovation. The multidimensional framework [11], [29] offers useful insights for blended TPD models, which must navigate the tension between fidelity to core pedagogical principles and responsiveness to diverse technological and contextual conditions. The emphasis on teacher agency and institutional integration underscores that meaningful scale involves not only procedural replication but also cultural and pedagogical transformation.

2.2.2. Scaling Impact for the Public Good [30]

McLean and Gargani [30] present a framework for scaling social innovations that generate public value. Their Scaling Impact model challenges linear notions of scale, instead advocating a context-sensitive and ethically grounded process that maximizes benefits while minimizing harms. The model introduces three dimensions of scaling. Scaling up targets laws, policies, or institutions to embed innovations within systemic structures. Scaling out expands initiatives

across geographic or demographic boundaries to reach new populations. Scaling deep, often considered the most transformative dimension, alters values, relationships, and cultural norms within communities and institutions. Though developed more broadly, its multidimensional, equity-oriented, and context-sensitive approach applies well to TPD, which also aims to move beyond numerical reach toward systemic and sustainable change.

Alongside these dimensions, four principles guide scaling for the public good: justification, optimal scale, coordination, and dynamic evaluation.

- *Justification*: Scaling must serve those most affected. It is not automatic but a shared decision grounded in evidence and values, requiring careful deliberation.
- *Optimal scale*: More is not always better. Scaling involves trade-offs, and the goal is to reach a level that balances magnitude, variety, sustainability, and equity of impact. The aim is not indiscriminate growth but achieving the greatest positive effect in a judicious way.
- *Coordination*: Scaling occurs within complex systems and depends on dynamic networks of actors. It requires adaptability, collaboration, and ongoing adjustment to unpredictable contexts.
- *Dynamic evaluation*: Scaling itself is an intervention that generates change over time. Continuous learning, reflection, and responsive measurement should begin before scaling and continue throughout and after implementation.

Together, these dimensions and principles underscore the idea that scaling impact is not merely a technical exercise, but a strategic and ethical endeavor. For TPD and other educational innovations, this model offers valuable guidance on how to scale in a way that is inclusive, intentional, and attuned to local needs and systemic complexity.

2.2.3. TPD@Scale Framework [5]

The TPD@Scale framework [5] responds to the challenge of delivering equitable and scalable professional learning in low-resource contexts through the strategic use of information and communication technologies (ICTs). It is guided by three foundational principles: Equity: inclusive access to high-quality TPD for all teachers, especially those in remote or underserved settings; Quality: evidence-based pedagogical design centered on collaboration, reflection, and coaching, with technology supporting rather than replacing human interaction; and Efficiency: strategic use resources and delivery systems strategically to achieve cost-effective scale without sacrificing relevance or impact. TPD@Scale complements Coburn's and Dede's frameworks by offering practical design and implementation guidance for digital and blended learning environments. It emphasizes the need for local adaptation, participatory design, and alignment with national education systems.

2.2.4. SABER-Teachers Framework (World Bank) [31]

The World Bank's SABER (Systems Approach for Better Educational Results)-Teachers framework describes policies for managing and improving the quality of teachers [31]. Although not specific to TPD, it provides more information about the institutional context that facilitates or limits scaling efforts. It identifies core domains such as: Clear teaching standards and competencies; Access to ongoing professional development; and Career progression, monitoring, and accountability mechanisms. SABER points to gaps in coherence and alignment of the system as a whole which must be dealt with if sustainable institutionalization of TPD reforms is to happen. Although it primarily reflects a top-down perspective, it can serve as a valuable complement to more practitioner-focused frameworks like TPD@Scale and Dede's model.

2.2.5. Comparative Insights

Even though the frameworks come from different contexts, they share valuable insights for scaling educational innovations or TPD (see table 1). They reject the idea that scaling is merely

geographical or numerical expansion. Authors such as Dede, McLean and Gargani, and Coburn stress that scale requires learning, organizational absorption, and controlled change. Teacher agency and local adaptation are equally critical. Dede, Coburn, and Wolfenden argue that teachers should not only participate but also adapt innovations to their contexts. Systemic alignment also emerges strongly, especially in the SABER and TPD@Scale frameworks, which emphasize the need for supportive policies, systems, and governance to sustain scaled efforts. Across all perspectives, contextualization is central: scalable impact depends on responsiveness to the cultural, political, and material realities of education systems.

Table 1. Comparison of Frameworks

Framework	Focus	Key Dimensions
Multidimensional framework by Coburn & Dede	Pedagogical depth & ownership	Depth, Sustainability, Spread, Ownership, Evolution
Scaling Impact (McLean & Gargani)	Public value & ethics	Scaling Up, Out, Deep
TPD@Scale (Wolfenden)	ICT-driven, equitable TPD	Equity, Quality, Efficiency
SABER-Teachers (World Bank)	Policy and system alignment	Standards, PD Access, Accountability
Cross-cutting themes - Teacher agency & contextual responsiveness (Coburn, Dede, Wolfenden) - Ethical, inclusive scaling (McLean & Gargani, Wolfenden) - Technological enablement for equity (Wolfenden) - Policy and infrastructure alignment (SABER, Wolfenden)		

Each framework highlights different dimensions of scaling TPD in under-resourced contexts. The *Multidimensional Framework for Scale* reframes scaling as a complex process involving depth, sustainability, ownership, and system integration, though it offers limited guidance for blended or digital TPD. The *Scaling Impact for the Public Good* framework emphasizes equity, contextual responsiveness, and continuous learning, but its broad scope and limited education focus reduce applicability for blended TPD. The *TPD@Scale* framework addresses technology-enabled professional development in resource-constrained settings, offering practical tools for modular content, peer learning, and local adaptation, though it focuses mainly on implementation rather than long-term system alignment. Finally, the World Bank's *SABER-Teachers* framework adds a system-level view, outlining policy conditions such as alignment with standards and teacher incentives, but does not directly engage with pedagogical or technological aspects of blended learning.

Together, these frameworks underscore the need for an integrated model that bridges conceptual, pedagogical, and systemic dimensions. The following section introduces such a model, synthesizing its strengths while addressing limitations.

2.3. Toward an Integrated Model for Scalable Blended TPD

Attempts to expand TPD in poorly resourced environments confront a dilemma: how to achieve high, relevant, context-specific learning within systemic constraints such as weak infrastructure, fragmented policies, and scarce resources. Many descaled models have valuable insights into blended TPD's dimensions of scale and its constructive elements, but there is little comprehensive guidance on how to implement these models into complex, resource-poor settings.

Building on literature on blended TPD and frameworks for scaling educational innovation, this study proposes the SCALE-BTPD (Scale Blended Teacher Professional Development) model, designed specifically for resource-scarce contexts. Its goal is to integrate and operationalize scaling frameworks such as Coburn's *Multidimensional Scale* (2003), Dede's *Evolutionary Scaling Dimension* (2006), McLean and Gargani's *Scaling Impact* (2019), Wolfenden's *TPD@Scale* (2022), and the World Bank's *SABER-Teachers*. The model is structured around three interwoven components (Figure 1): Enabling Conditions (Outer Layer); Blended TPD Pathways (Middle Layer); Iterative Scaling Mechanism (Core Layer).

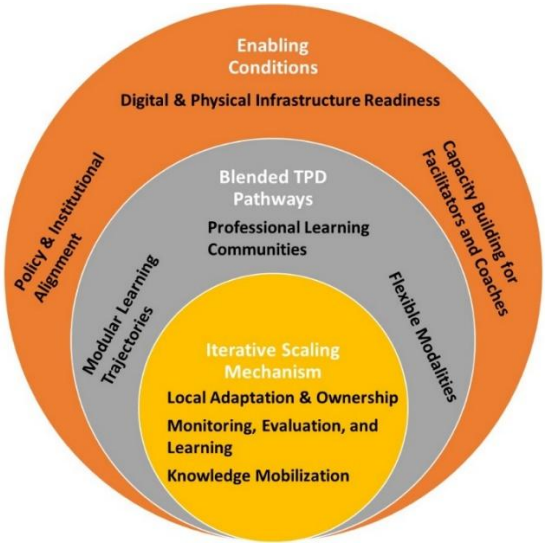

Figure 1. SCALE-BTPD model

Enabling Conditions (Outer Layer): These foundational elements ensure scalable, equitable, and impactful TPD.

- Policy & Institutional Alignment: Following *SABER-Teachers*, coherent national policies, standards, and incentives should link TPD to teacher appraisal and promotion.
- Digital & Physical Infrastructure Readiness: Infrastructure mapping should leverage local ICT while using alternatives in low-connectivity areas, such as radio lessons, preloaded USB/CD content, printed workbooks with phone mentoring, or low-bandwidth tools for study, collaboration, and monitoring.
- Capacity Building for Facilitators and Specialists: A two-tier structure is recommended: content specialists for quality, moderators for delivery. Both require digital and pedagogical skills.

Enabling conditions provide the foundation for sustainable and inclusive TPD. In resource-constrained contexts, policy reform and institutional restructuring are essential to ensure that professional development becomes an integral part of teachers' career progression and, ultimately, improves education quality. In terms of infrastructure, low-tech solutions can help bridge the digital divide. Building local facilitator capacity ensures contextual relevance, strengthens delivery, and follow-up supports.

Blended TPD Pathways (Middle Layer): This layer focuses on instructional design and delivery.

- Modular Learning Trajectories: Combine self-study (MOOCs, videos, worksheets) with synchronous sessions. Each module should include reflection, application, and feedback.
- PLCs: Support peer engagement and ongoing reflection, adapted to school circumstances, time constraints, and access levels.

- Flexible Modalities: Provide multi-modal options online, offline, hybrid, mobile to enhance scalability and autonomy. Examples include SMS-based communities of practice and interactive voice response IVR systems delivering audio modules and quizzes.

These pathways enable teachers to learn at their own pace, support deep reflection through PLCs, and expand inclusion through flexible, low-tech delivery.

Iterative Scaling Mechanism (Core Layer): This central component describes how TPD innovations evolve from localized pilots to broader policy adoption.

- Local Adaptation & Ownership: Begin with school- or district-level pilots. Teachers must be able to customize content and integrate it into practice.
- Monitoring, Evaluation, and Learning (MEL): Frameworks should track reach, engagement, and shifts in teacher beliefs and practice, while embedding formative feedback loops across implementation stages.
- Knowledge Mobilization: Following Dede, implementation feedback should drive program revision. Case studies, lesson documentation, teacher voices should inform both policy and practice.

The Iterative Scaling Mechanism is particularly relevant for under-resourced contexts because it recognizes and adapts to the realities of limited capacity, infrastructure, and support systems. Its emphasis on gradual transition helps reduce resource strain, increase sustainability, and avoid mechanical replication. In many low-resource systems, past scaling efforts have focused on rapid replication without adapting to local contexts often resulting in low uptake or ineffective implementation.

The SCALE-BTPD model addresses the literature gap by integrating pedagogical and systemic dimensions through three layers. It articulates a design that is both scalable and flexible for adaptable across educational systems, structure systemically for learners, actionable guidance for policymakers, funders, and implementers amidst sophisticated settings, and deeply integrated to prioritizes depth over superficial reach. In regions, where resources are minimal, the SCALE-BTPD framework offers a constructive, practical approach for building robust, scalable systems for blended TPD.

3. Conclusions

The proposed SCALE-BTPD model offers a theoretically grounded and practice-oriented approach to designing and scaling blended TPD in under-resourced contexts. By synthesizing insights from established frameworks and adapting them to the complexities of low-resource environments, this study contributes a new lens through which to understand, implement, and evaluate scalable blended TPD initiatives.

In the Vietnamese context, although some education policies reference blended approaches, they often lack precise definitions or regulatory frameworks detailing what constitutes blended TPD or how it should be organized. Nonetheless, several national-scale initiatives have experimented with blended modalities. One notable example is the *Enhancing Teacher Education Program* (ETEP), implemented between 2017 and 2022. This program aimed to strengthen Teacher Education Institutions (TEIs) to enhance teacher and principal capacity for implementing the national curriculum introduced in 2018. ETEP adopted a modular blended learning structure, developed by lecturers from eight key TEIs. Training modules were delivered using a "5-3-7" format: five days of guided self-study via a learning management system (LMS), three days of face-to-face discussion and reflection, and seven days dedicated to completing assignments. In response to the COVID-19 pandemic, this model was adapted to a "7-2-7" structure, which replaced face-to-face meetings with online synchronous sessions.

ETEP reached more than 30,000 teachers with a high completion rate of 98.4%. Reports highlights one of its key strengths: the training content was meaningful, and the materials were of high quality, supporting teachers in adopting appropriate teaching methods. However, limitations emerged in participant engagement and instructional depth. Teachers often reported low motivation to participate in synchronous online sessions, which in turn reduced opportunities for meaningful dialogue and peer exchange. Many participants struggled to engage with the self-directed learning phase, leading trainers to repurpose online sessions to cover foundational content, thereby constraining time for reflection and collaboration. Concerns were raised about the top-down nature of the program and its limited emphasis on practical, classroom-oriented learning activities [32].

Drawing from the lessons of ETEP and guided by the principles of the SCALE-BTPD model, several key implications emerge for the future design and implementation of blended TPD in under-resourced contexts like Vietnam. First, strategic policy integration is essential. The absence of a clear policy definition for blended TPD has led to inconsistent interpretations and implementation. As highlighted by VVOB [32], stakeholders in Vietnam often equate blended TPD with simply combining online and face-to-face components, without a broader pedagogical or systemic vision. Embedding blended TPD within national teacher development strategies, and aligning it with career progression frameworks and institutional goals, is critical for ensuring long-term impact and coherence. Second, investment in both infrastructure and human capacity is vital. Blended TPD at scale depends not only on the availability of digital tools and connectivity but also on the readiness of facilitators, mentors, and technical staff. Targeted support for under-resourced areas, along with training in digital pedagogy, will be crucial for equitable implementation. Third, blended TPD must be flexible and inclusive by design. Programs should be modular and adaptable to teachers' time constraints, digital skill levels, and access to devices. Particular attention must be given to marginalized or geographically isolated communities to ensure no teacher is left behind. Fourth, there must be a strong emphasis on teacher agency and contextual adaptation. Sustainable scaling requires that teachers are not treated merely as recipients but as active contributors who can localize and co-create content. When teachers feel a sense of ownership over their professional learning, engagement and relevance naturally increase. Finally, the SCALE-BTPD model emphasizes the importance of iterative scaling and learning systems. Anecdotal evidence suggests that continuous feedback loops are largely absent from many TPD programs in Vietnam. Embedding mechanisms for monitoring, evaluation, and knowledge sharing at each phase of implementation will enable adaptive learning and long-term sustainability.

In conclusion, as education systems in Vietnam and beyond face increasing pressure to improve teacher quality at scale, blended TPD has gained traction as a promising pathway. However, without an integrated, context-responsive framework, such efforts risk fragmentation and limited impact. The SCALE-BTPD model responds to this challenge by offering a structured yet flexible approach that integrates policy, infrastructure, pedagogy, and teacher empowerment. It reconceptualizes scale not as a one-time expansion but as a continuous, adaptive, and equity-focused process grounded in local realities and driven by professional agency. A key limitation of this study is that the model has not yet been empirically tested for feasibility in low-resource settings. Therefore, future research should include pilot implementation studies to assess the model's practicality, effectiveness, adaptability in challenging educational contexts, the role of teachers in this model, and what conditions enable or hinder its successful implementation. Ultimately, the goal is not just to scale TPD programs, but to scale what matters deep, durable improvements in teaching and learning.

Acknowledgement: This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 503.01-2023.10.

REFERENCES

[1] Graham CR, Allen S & Ure D, (2005). *Benefits and challenges of blended learning environments. Encyclopedia of Information Science and Technology* (First Edition). IGI Global, p. 253-259.

[2] Leake S, (2014). *A Blended and Face-to-Face Comparison of Teacher Professional Development: What's the Impact?*. Arizona State University.

[3] Goos M, O'Donoghue J, Ní Ríordáin M, Faulkner F, Hall T & O'Meara N, (2020). Designing a national blended learning program for "out-of-field" mathematics teacher professional development. *ZDM*, 52, 893-905.

[4] Fishman B, Penuel WR, Hegedus S & Roschelle J, (2011). What happens when the research ends? Factors related to the sustainability of a technology-infused mathematics curriculum. *Journal of Computers in Mathematics and Science Teaching*, 30, 329-353.

[5] Wolfenden F, (2022). *TPD@Scale: Designing teacher professional development with ICTs to support system-wide improvement in teaching.* Foundation for Information Technology Education and Development.

[6] Dobbs CL, Ippolito J & Charner-Laird M, (2017). Scaling up professional learning: technical expectations and adaptive challenges. *Professional Development in Education*, 43, 729-748. https://doi.org/10.1080/19415257.2016.1238834.

[7] Sun M, Penuel WR, Frank KA, Gallagher HA & Youngs P, (2013). Shaping Professional Development to Promote the Diffusion of Instructional Expertise Among Teachers. *Educational Evaluation and Policy Analysis,* 35, 344-369. https://doi.org/10.3102/0162373713482763.

[8] Hennessy S, D'Angelo S, McIntyre N, Koomar S, Kreimeia A, Cao L, et al., (2022). Technology Use for Teacher Professional Development in Low- and Middle-Income Countries: A systematic review. *Computers and Education Open,* 3, 100080. https://doi.org/10.1016/j.caeo.2022.100080.

[9] Burns M, (2023). *Technology in education*. Paper Commissioned for The 2023.

[10] Chabbott C, (2015). *Institutionalizing health and education for all: Global goals, innovations, and scaling up*. Teachers College Press.

[11] Coburn CE, (2003). Rethinking Scale: Moving Beyond Numbers to Deep and Lasting Change. *Educational Researcher*, 32, 3-12. https://doi.org/10.3102/0013189X032006003.

[12] Lawson HA & Van Veen D, (2016). Planning for Scale-Up, Scale-Out, Sustainability, Continuous Improvement, and Accountability. In: Lawson HA & Van Veen D (editors), Developing Community Schools, Community Learning Centers, Extended-service Schools and Multi-service Schools, p. 363-405. *Springer International Publishing, Cham*. https://doi.org/10.1007/978-3-319-25664-1_14.

[13] Clements DH, Sarama J, Wolfe CB & Spitler ME, (2015). Sustainability of a Scale-Up Intervention in Early Mathematics: A Longitudinal Evaluation of Implementation Fidelity. *Early Education and Development*, 26, 427-449. https://doi.org/10.1080/10409289.2015.968242.

[14] Timperley H, (2011). *Realizing the power of professional learning*. McGraw-Hill Education (UK).

[15] Cohen-Vogel L, Tichnor-Wagner A, Allen D, Harrison C, Kainz K, Socol AR, et al., (2015). Implementing Educational Innovations at Scale: Transforming Researchers Into Continuous Improvement Scientists. *Educational Policy*, 29, 257-277. https://doi.org/10.1177/0895904814560886.

[16] Scheirer MA & Dearing JW, (2011). An Agenda for Research on the Sustainability of Public Health Programs. *Am J Public Health*, 101, 2059-2067. https://doi.org/10.2105/AJPH.2011.300193.

[17] Alammary A, Sheard J & Carbone A, (2014). Blended learning in higher education: Three different design approaches. *AJET*, 30. https://doi.org/10.14742/ajet.693.

[18] Allen IE & Seaman J, (2014). *Grade change: Tracking online education in the United States*.

[19] Keengwe J & Kang JJ, (2013). A review of empirical research on blended learning in teacher education programs. *Education and Information Technologies*, 18, 479-493. https://doi.org/10.1007/s10639-011-9182-8.

[20] Calderón A, Scanlon D, MacPhail A & Moody B, (2021). An integrated blended learning approach for physical education teacher education programmes: teacher educators' and pre-service teachers' experiences. *Physical Education and Sport Pedagogy*, 26, 562-577. https://doi.org/10.1080/17408989.2020.1823961.

[21] Graham CR, (2013). *Emerging Practice and Research in Blended Learning*. Handbook of Distance Education. Routledge. https://doi.org/10.4324/9780203803738.ch21.

[22] Arifani Y, Khaja FNM, Suryanti S & Wardhono A, (2019). The Influence of Blended In-service Teacher Professional Training on EFL Teacher Creativity and Teaching Effectiveness. *3L: Southeast Asian Journal of English Language Studies*, 25.

[23] Hernandez LL, (2022). *A Blended Approach to Teacher Professional Development*. PhD Thesis, Arizona State University.

[24] Uribe-Banda C, Wood E, Gottardo A, Biddle J, Ghaa C, Iminza R, et al., (2023). Assessing blended and online-only delivery formats for teacher professional development in Kenya. *Cogent Education*, 10, 2191414.

[25] VVOB, (2023). BLEND-ON: A guide on how to blend in-person & remote learning for professional development of educators.

[26] TPD@Scale Coalition for the Global South, (2022). *TPDScale-Compendium*. Foundation for Information Technology Education and Development.

[27] Mintii IS, (2023). Blended learning: definition, concept, and relevance. *Educ Dimens*, 8, 85-111. https://doi.org/10.31812/ed.539.

[28] Graham CR, (2006). *Blended learning systems: Definition, current trends, and future directions*. The Handbook of Blended Learning: Global Perspectives. Pfeiffer, San Francisco.

[29] Dede C, (2006). *Scaling up: Evolving innovations beyond ideal settings to challenging contexts of practice*. Na.

[30] McLean R & Gargani J, (2019). *Scaling impact: innovation for the public good*. Routledge.

[31] World Bank, (2013). *What Matters Most for Teacher Policies: A Framework Paper*. DC.

[32] VVOB Vietnam, (2023). A study on blended Continuous Professional Development (CPD) approaches in pre-service and in-service primary teacher education in Vietnam.