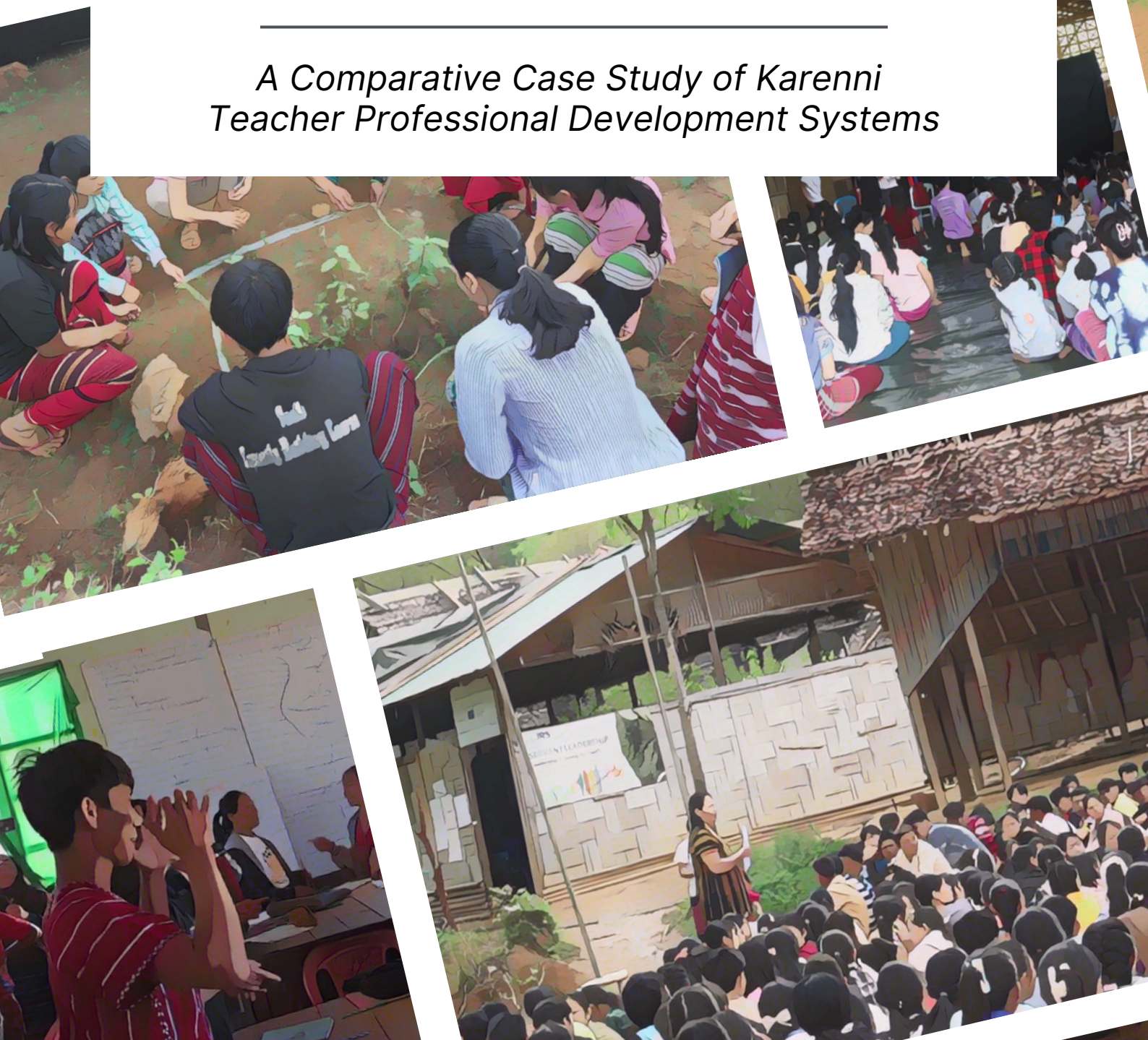# Systems Thinking and Complexity

A Comparative Case Study of Karenni Teacher Professional Development Systems

Research Team:

Gray Rinehart
Min Layi Chan
Greg Tyrosvoutis

Acknowledgements

Executive Summary

Introduction to the Study

As global displacement reaches record highs - with over 122 million forcibly displaced people, and more than half of all refugees under the age of 18 - teacher professional development (TPD) must be recognized as a critical pillar of education in emergency contexts (UNHCR, 2024). In settings affected by conflict and crisis, teachers frequently take on responsibilities well beyond instruction, yet they face severe challenges, including limited access to qualifications, ongoing training, and professional support (Richardson et al., 2018).

This study contributes to the growing literature on TPD in crisis settings through a comparative case study approach of two Karenni TPD systems: (i) the Karenni Education Department (KnED), which oversees education in two temporary shelters in Thailand, and (ii) the Seh Theh Foundation (STF), which supports teachers across conflict-affected areas of Karenni State, Myanmar. The study offers descriptive and analytical insights into how these systems function under conditions of chronic disruption and resource scarcity. While both systems are under immense strain, they continue to adapt in response to instability.

In Thailand, more than 11,000 refugees live in temporary shelters where KnED administers education services (TBC, 2025). Despite strong community-led efforts, refugee teachers remain legally and professionally isolated from the Thai state, with limited recognition or pathways for professional advancement (Tyrosvoutis et al., 2024). In Myanmar's Karenni State, ongoing conflict has displaced up to 85% of the population (Wei, 2024; Mizzima, 2024). STF supports thousands of teachers working across a dispersed, under-resourced landscape. The collapse of Myanmar Ministry of Education provision and persistent conflict have led to a patchwork of schooling models, with many teachers new to the profession and working in areas with minimal infrastructure.

This study explores the design and dynamics of Karenni TPD systems in Thailand and in Myanmar through three core questions:
1. How do Karenni TPD systems operate?
2. Do they exhibit characteristics of complex adaptive systems?
3. How can they be more effectively supported?

Findings draw on evidence from 23 key informant interviews and focus group discussions with stakeholders across both contexts (27 participants from Thailand and 25 from Myanmar). The research was conducted between August and December 2024, with findings validated and deepened through a participatory workshop held with KnED and STF in May 2025.

The study applies systems thinking and complexity theory to better understand the two TPD systems. This framing informs the study's analysis of how Karenni TPD systems operate and how they might be more effectively supported.

Rather than viewing TPD as a fixed or input-driven intervention, systems thinking emphasizes the interconnectedness of key actors - such as teachers, trainers, and school leaders - and the ways their relationships and contexts shape how TPD functions. From this perspective, TPD systems are understood as dynamic and relational, shaped by local realities and feedback pathways rather than predictable outcomes.

Building on complexity science, the concept of complex adaptive systems offers a lens for analyzing TPD systems that adapt and evolve in response to disruption. Complex adaptive systems are characterized by distributed decision-making, emergent behaviors, and context-dependent outcomes. As such, they benefit from approaches centered on learning, experimentation, and flexibility rather than top-down planning.

Findings: Karenni TPD in Thailand (KnED)

The KnED-managed TPD system in Thailand combines structured pre-term training with more localized in-term coaching. Pre-term coaching is conducted twice annually, is centrally planned, and targets both new and experienced teachers. In contrast, in-term coaching is decentralized and shaped by ongoing collaboration between school leaders, trainers, and teachers. Monthly classroom observations serve as entry points for responsive coaching, informed by some standardized tools and immediate feedback pathways. While coaching is typically scheduled, there is growing openness to on-demand support, especially as teachers begin to identify and communicate their own professional needs.

This dual structure - centralized pre-term training and decentralized in-term coaching - enables the system to maintain continuity amid broader uncertainty in the temporary shelters where it operates. Consequently, this model can be described as designed for disruption (Rinehart and Tyrosvoutis, 2023) in that it is adaptive and responsive to potential disruptions due to the tightness of feedback pathways. Regular interaction and proximity between trainers and teachers foster trust and reassure teachers that their needs will be recognized and, as much as possible, addressed.

The KnED system exhibits several hallmarks of a complex adaptive system: dynamic interactions among local actors, evolving expectations from increasingly experienced teachers, and significant impact potential from relatively small inputs. The proximity of trainers and schools facilitates more immediate and iterative problem-solving, while the absence of a formal teacher policy leaves room for experimentation. However, the system's capacity to adapt is bounded by upstream constraints, namely the availability of relevant content and trainer capacity, both of which depend on donor support. As teachers grow professionally, the expectations for coaching are likely to grow more nuanced, creating demand for more advanced training and differentiated support. Strengthening the trainer cadre and expanding relevant training materials will be essential for meeting this demand. In this context, targeted investments in coaching - especially those that support decentralized and school-embedded professional learning - have the potential to generate outsized returns.
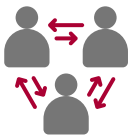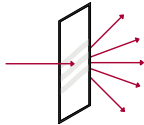
Findings: Karenni TPD in Myanmar (STF)

The STF-led TPD system in Myanmar is emerging and evolving under the constraints of ongoing conflict and crisis. STF operates as one of several TPD providers in areas under the Karenni State Interim Executive Council, though its reach remains quite limited - training an estimated 200 teachers per year through intermittent, five-day in-service sessions. Training is centrally planned based on data collected by field teams and adjusted to accommodate local security conditions, often requiring travel to remote areas and close collaboration with local authorities. Teachers attending sessions are expected to cascade their learning upon return to their schools. While STF's central office aspires to evidence-based planning, access to timely and actionable data remains limited due to telecommunications challenges and physical distance between the central office, field sites, and teachers. This contributes to delays, inconsistent training targeting, and a continued reliance on adaptive judgment by trainers in the field.

Despite these constraints, the system demonstrates several characteristics of a complex adaptive system. Trainers are encouraged to adjust content in real time based on teachers' expressed needs, and data flows upward from field teams and following training sessions help shape future TPD content. However, the frequency of training and the number of trainers appears insufficient to meet growing demand, and decision-making authority largely remains at the central level. A tension persists between STF's desire to design a more coordinated and uniform TPD approach and the realities of its operating environment, which often require decentralized and emergent problem-solving and pragmatic adaptation.

In this sense, STF's TPD system is still in a formative phase: designing during disruption. The system's trajectory may hinge on its ability to experiment with new approaches and shift toward more distributed models of TPD delivery that better respond to teachers' needs and the fluid dynamics of Karenni State. Signs of impact - such as increased teacher motivation, community engagement, and student enrollment - suggest potential for transformative change if the system is able to build on existing momentum and invest in scalable, context-responsive strategies.

Teacher professional development as a complex adaptive system

Element	Description (related to Karenni contexts	Implications
Interconnected & interdependent elements	TPD systems consist of interrelated actors (e.g. teachers, trainers, leaders, donors), processes (e.g. feedback, planning), and intangible dimensions (e.g. beliefs, norms, relationships). These components continuously influence one another.	Actors at all levels should be aware of how changes in one part of the system may ripple across others. Coordination, reflection, and systems awareness should be promoted across the system.
System tightness vs loseness	The TPD system in Thailand, due to geographic proximity and regular in-term contact, exhibits relatively tight coupling. In contrast, the system in Myanmar operates more loosely, with less frequent interaction due to conflict and physical distance.	Strategies should reflect the degree of system tightness. In Thailand, stronger coordination and rapid feedback pathways can be leveraged. In Myanmar, flexible structures and autonomous decision-making at the middle and local levels should be prioritized.
Emergence	While the central level may aim for data-driven planning, delays in data collection and transmission can result in reactive (rather than proactive) decision-making. More actionable information is gathered at the middle and local levels during implementation.	Central-level actors should accommodate emergent and unpredictable conditions, while middle and local actors should be empowered to make timely, evidence-informed decisions in real time.
Nonlinearity and sensitivity to local conditions	Small, well-placed interventions can have outsized effects in these resource-scarce and volatile settings. Outcomes may be unpredicta--ble at times, but this should be embraced and learnt from, rather than avoided or viewed as failure.	Prioritize lower-cost, higher-leverage interventions. Monitor changes closely, keep an open mind for learnings, and be ready to scale successful local adaptations.
Self-organization	Both TPD systems exhibit signs of spontaneous organization, such as teachers initiating peer support or field teams adapting training. These reflect a natural tendency towards decentralization and localized initiative.	Encourage and formalize locally driven TPD initiatives. Invest in mechanisms that allow schools to lead and adapt support to their own needs, with guidance rather than control from the central level.
Co-evolution	As teachers develop professionally, their expectations and learning needs become more complex. TPD systems and those who support teachers must adapt in response to this evolving demand.	TPD design should be iterative. Regularly update content and delivery methods, and invest in ongoing professional development for trainers and other TPD staff to match evolving teacher capacities.

Supporting Karenni TPD: Collaborative Professionalism

Collaborative professionalism refers to networks of teachers, school leaders, trainers, and other middle- and local-level educational personnel working together in communities of practice (CoPs) or professional learning communities (PLCs). Collaborative professionalism aims to improve teaching through processes of open dialogue, mutual trust, and shared responsibility between educators and the professionals who support them. These networks function through horizontal (peer-to-peer) and vertical (teacher-to-leader/trainer) relationships, and they can operate within individual schools or across school clusters.

Effective facilitation by school leaders and trainers is essential, as is appropriate incentivization (whether intrinsic or extrinsic) to sustain engagement and leadership within these networks. International examples demonstrate that collaborative professionalism can be adopted to challenging contexts and yield meaningful improvements in teacher practice when supported by capable mid-level leaders.

In the Karenni TPD system in Thailand, strong foundations for collaborative professionalism already exist through the in-term coaching program. These can be deepened by introducing a cluster-based model to facilitate cross-school collaboration, and by formally establishing CoPs or PLCs supported by KnED trainers and school leaders. Investments by donors should focus on enhancing trainer capacity, resourcing regular convenings, and introducing new coaching and training content. While resource constraints limit large-scale TPD, localized approaches through collaborative professionalism can offer flexible and responsive alternatives that are cost-effective and impactful. Aligning collaborative efforts around a teacher competency framework could help balance the need for localized responsiveness with a desire for greater coherence of teacher professionalism and practice across schools.

In Myanmar, where STF's training provision remains infrequent and quite centralized, collaborative professionalism offers an opportunity to embed TPD more locally. School-based or cluster-based CoPs and PLCs led by STF trainers, headteachers, or other high-performing educators could help extend the reach of TPD between formal training events. This would require re-orienting trainer roles, improving their coaching capabilities, and ensuring sufficient resources for mobility and facilitation. Further consultations with STF are recommended to co-develop feasible models and align these efforts with existing field team structures and capacity.

Supporting Karenni TPD: Endogenous Systems Leadership

Endogenous systems leadership emphasizes distributed leadership grounded in local realities and shared across three levels of an education system: local (teachers, students, parents); middle (trainers, headteachers, field teams); and central (policymakers, system leaders). This approach recognizes that local and middle-level actors often exhibit responsiveness and innovation - especially in conflict-affected settings - and seeks to empower them to shape and adapt implementation strategies. It fosters systems thinking, encourages flexible and decentralized decision-making, and promotes a culture of experimentation and adaptation rather than rigid adherence to central mandates.

This form of leadership is particularly suited to complex adaptive systems, which are inherently dynamic and nonlinear. By supporting multi-level participation, endogenous systems leadership enables the middle tier to act as both a relay and a driver of change by communicating needs upward, implementing policies downward, and facilitating localized responses. Evidence suggests that such leadership models thrive when mid-level actors are resourced, trusted, and granted sufficient autonomy. These same principles align closely with the conditions needed for collaborative professionalism to succeed, making the two approaches mutually reinforcing.

Within both Karenni TPD systems, headteachers, trainers, and field teams form the middle tier and are pivotal for data collection, policy enactment, coaching, and school-to-school collaboration. However, while KnED and STF express interest in teacher voice and localized decision-making, structural and cultural constraints often inhibit this. Middle and local actors may lack clarity, confidence, or authority to take initiative, while central leaders may struggle to establish efficient and effective feedback pathways. Addressing these constraints by strengthening mid-level capacities and legitimizing shared decision-making could unlock more responsive, resilient, and contextually grounded TPD systems.

A constructive tension exists between the complex adaptive nature of the TPD systems and the more centralized preferences that systems designers may have. While decentralization within the system may enhance its responsiveness, local and middle-tier actors may not have the confidence or capacity to assume increased responsibility around decision-making and initiative-taking. Similarly, central-level actors may be uncertain how to delegate authority effectively and with appropriate degrees of and protocols for accountability.

This tension can be reconciled through strategic investments in endogenous systems leadership by building capacity at all levels of the system. This research only begins to surface the tension and balance between decentralization and centralization within TPD systems. Further investigation is therefore recommended into how decentralized self-organization of the system can be better balanced with system-level oversight and ambition.

Key Recommendations

The Karenni TPD systems in Thailand and in Myanmar operate under distinct yet equally challenging conditions shaped by protracted crisis and displacement. Strengthening these systems will most likely require approaches aligned with their adaptive nature. Two strategies - collaborative professionalism and endogenous systems leadership - are especially well-suited to enhance TPD as a complex adaptive system.

Key recommendations include:

- **Strengthen local data use for decision-making:** Empower school leaders, trainers, and field teams to collect and act on school-level data (such as classroom observations and need assessments) without over-reliance on central-level approval. Streamlined, digital tools (e.g. tablets and cloud storage) can support timely and usable information flows.

- **Pilot new, peer-driven TPD models:** Support the introduction of communities of practice and professional learning communities, ideally organized through school clusters. These models should be equipped with facilitation tools (e.g. coaching scripts, action plans) and adequately resourced with time, materials, and financial support. Facilitators should be incentivized through recognition or performance-based rewards.

- **Invest in the capacity of the middle tier:** Prioritize professional development for trainers, headteachers, and field teams through robust training of trainer programs. These should emphasize coaching and mentoring skills and include practical components led by experts familiar with the Karenni context. Strengthening their capacity in data collection and use should also be considered.

- **Use central-level policies to establish shared vision:** Develop and implement policies and frameworks (e.g. teacher competency standards frameworks, curriculum standards) that articulate a clear vision for TPD. These should serve as anchors for decentralized efforts while preserving local flexibility.

- **Avoid relying solely on linear planning tools:** Utilize alternative approaches such as outcome mapping, adaptive theories of change, or systems- and complexity-informed approaches when designing, monitoring, and evaluating TPD in complex adaptive systems.

- **Harmonize strategies and pool resources across actors:** Donors and development partners should coordinate efforts and pool resources to reduce duplication, address gaps, promote learning, and build synergies. In Myanmar, STF should explore strategic collaboration with other education providers in Karenni to maximize collective impact and leverage each actor's comparative advantage.

When we provide teacher training, children who couldn't attend school can now attend school. Teachers who may not have wanted to teach become interested in teaching... [parents] also become interested in education. They support us much more, and work with us much more.