Teacher Professional Development at Scale in Indonesia: A Collective Case Study of Three Teacher Learning Centres

Iwan Pranoto, Juliana, Wardatul Hasanah
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Design
Kriselle de Leon

Layout
Paola Micah Peñera

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Acronyms

FGD	Focus Group Discussion
GTK	Guru dan Tenaga Kependidikan; GTK is a directorate-general managing the development needs of the teachers and the education personnel
ICT	Information and Communication Technology
MGMP	Musyawarah Guru Mata Pelajaran; it is a subject teacher working group
MoEC	(Indonesian) Ministry of Education and Culture
MT	Master Teacher
OECD	Organisation for Economic Co-operation and Development
PISA	Program for International Student Assessment
PSF	Putera Sampoerna Foundation
SDO	School Development Outreach
TLC	Teacher Learning Centre
TPD	Teacher Professional Development
UN	The United Nations

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Executive Summary

As a founding member of the Teacher Professional Development at Scale (TPD@Scale) Coalition for the Global South, Putera Sampoerna Foundation (PSF) revamped its Teacher Learning Centre (TLC) program and its overall objectives in 2019 to better support the professional development of Indonesian teachers. PSF TLC aims to provide teachers with localized support and broader access to quality professional development (face-to-face and online), learning facilities, and resources in a local setting.

Effective teacher professional development (TPD) (Darling-Hammond, Hyler, & Gardner, 2017) and learning at scale helped give rise to TPD@Scale where information and communication technologies (ICTs) are used to enhance quality, equity, and efficiency (TPD@Scale Coalition, 2019). PSF TLC focuses on the contextualized and needs-driven professional development activities (quality), wider local teachers' TPD opportunities and engagement (equity), and the utilization of available ICT resources to ensure cost-effectiveness and promote lifelong professional learning (efficiency), resulting in the progressive improvement of teachers' capacity in pedagogical knowledge, ICT skills, and quality teaching and learning. As teachers develop a higher teaching confidence level gained from TPD, they apply various pedagogical and ICT innovations in their classrooms to enhance student engagement and learning outcomes. PSF TLC ensures that equity is attained along with quality. TLC is made available to all teachers in rural and remote areas, regardless of gender, ethnicity, geographical location, etc.

This study focused on three out of 10 TLCs in the regencies of Gowa (South Sulawesi), Karawang (West Java), and Kudus (Central Java). Each TLC independently conducted face-to-face and online activities based on the needs of local schools and teachers and designed its programs to support TPD and overcome local constraints. These learning centres successfully ran several TPD sessions by utilizing available resources in 2020/2021, even during the COVID-19 pandemic.

This study examined the progress and impacts of the PSF TLC in 2020, with 326 valid survey responses collected from teachers who participated in PSF TLCs in the three above-mentioned areas. The findings showed: **First**, the mode and the sustainability of PSF TLC were workable in providing contextualized, need-driven, and quality TPD. **Second**, that ICT played an increasingly important role in the efficiency of TPD and quality education. **Third**, that PSF TLCs supported teachers with different traits, such as educational background, employment status (state or private), school types, and gender.

While the teacher participants in this study generally saw the TPD activities and resources as improving their professional learning and classroom teaching, this study found that their **employment status** was a key determining factor in this perception, and the state-employed teachers, as compared to those teachers in

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private schools, considered the **training activities and materials** at PSF TLC as more suitable to their classroom practice. However, the privately employed teachers reported their observation of an increase in students' engagement when they applied what they learned from PSF TLC TPD. While activities and resources are likely to have considerable impacts on the effectiveness of PSF TLC and quality TPD in the long run, activities and resources may need to cater to teachers from different school types.

Furthermore, TLC collaborations with universities and other agencies and organizations have provided a validated set of TPD activities and resources for pre-service teachers, equipping them with a more comprehensive real-world teaching experience.

Future research on TLCs could examine the correlation between the teachers' educational background and the TPD activities, and between teachers' professional learning and students' engagement in schools.

Key Words

Teacher Professional Development, Teacher Learning Centre, ICT, training materials, Indonesia

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Introduction and Context

Indonesia has implemented a wide range of teacher reforms, e.g., improving teachers' quality through the teacher certification incentive, the national teachers' competency test, and a centralized teachers' professional development program. Despite notable participation progress over the years, students' performance has generally remained unchanged. The Research and Development Unit (Balitbang) of the Ministry of Education and Culture (MoEC) and the Organisation for Economic Co-operation and Development (OECD) collaboratively reported low and stagnant student performance in the last two decades (Puspendik-Balitbang Kemdikbud and OECD, 2019, p. 43).

Figure 1. The continuous decrease in the number of teachers.

Number of Active Teachers
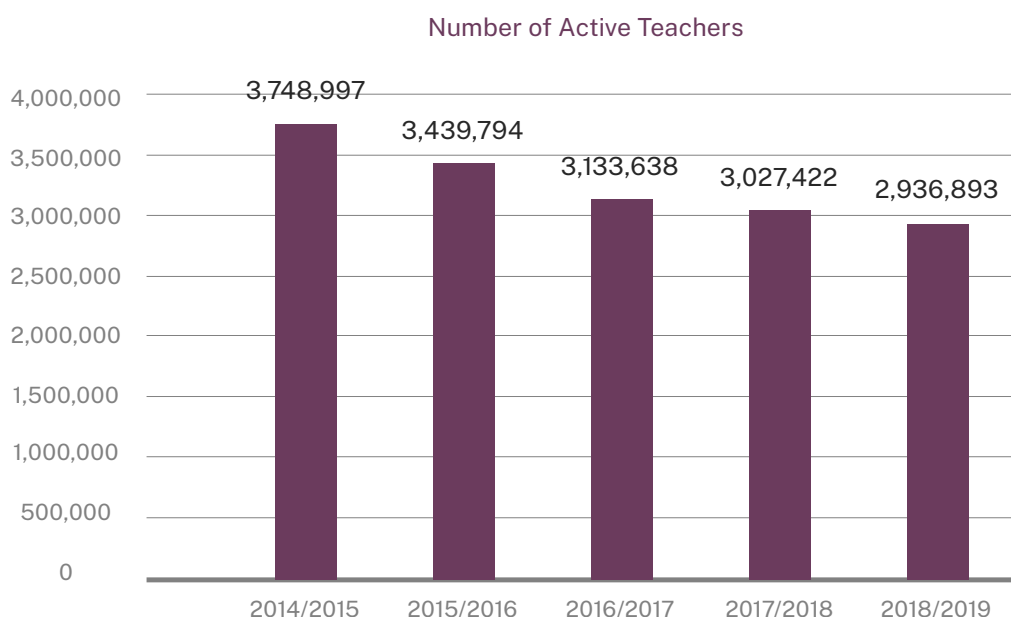
The reform took place as Indonesia faced challenges in terms of quality, inclusivity, and availability of quality teachers. There was a continuously decreasing trend in the number of active teachers in the last five years, as shown in Figure 1 (Lokadata, 2020a). UNESCO and Indonesia Economic Forum reported that the trend is likely to continue, with a 6% annual decrease rate in the years to come (Fahlevi, 2020) (Indonesia Economic Forum, 2019). There is ongoing teacher recruitment, but the recruitment rate has not been able to catch up with the decline.

To have human resources with a specific skill set, Indonesia needs better education and a professional development system. A public-private partnership is encouraged

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to develop adaptive and innovative graduates. Putera Sampoerna Foundation (PSF) initiated various teachers' professional development (TPD) programs through its Teacher Learning Centre (TLC) unit. PSF TLC adopted the TPD@Scale professional development construct in 2019 to continuously improve education in the 10 regencies and provide an adoption model in other countries.

The study, conducted by TPD@Scale, examined how equity, quality, and efficiency were reflected in PSF TLC activities in three particular regencies: Gowa (South Sulawesi), Karawang (West Java), and Kudus (Central Java) (TPD@Scale Coalition, 2019). Using activity theory, Lim et al. (2020) examined how PSF TLC in Kudus enhanced teachers' access to quality TPD. Each PSF TLC designed the activities making use of its locality's unique characteristics and ICT capability. Teachers did not need long, exhausting, costly, and dangerous travel since PSF TLCs, by design, are at the regency or district level, and they conduct various professional development activities at those levels. Maximizing a location thus enables teachers to access TPD within their regency.

The PSF TLC design places ICT as a critical part of TPD. Even though some activities in PSF TLC used an in-person approach, most TPD and seminar activities in 2020 were online. The PSF TLC's localization and ICT utilization may partially answer the complex challenges of Indonesian teaching quality. However, it is undeniable that teachers' digital literacy and the provision of ICT infrastructure still have persisting issues that must be addressed.

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The Centre for Information, Communication and Technology (Pusat Data dan Teknologi Informasi) or Pustekkom, a centre under the MoEC, evaluated 28,000 teachers in 2020. Pustekkom learned that only 46% of those 28,000 teachers reached the lowest IT competence level (Kanalberita, 2020). They also found that only 40% of teachers could utilize ICT in their instruction (Wahyuni, 2020). ICT adoption in TPD and education in Indonesia is not yet feasible nationally. Besides the digital literacy gaps among teachers, there were internet infrastructure gaps among schools and regions. In 2020, there were around 7,552 schools without electricity, and while 33,227 schools had electricity, they had no internet facilities (Lokadata, 2020b). Lim et al. (2021) similarly concluded that many families and communities in ASEAN countries could not afford remote learning. This study aimed to observe how simple and widely available computer or even cellphone applications might appreciably impact professional development.

To address the shortage of quality teachers, the Indonesian government established and empowered a subject teacher working group, the Musyawarah Guru Mata Pelajaran (MGMP) or English Teacher Forum for professional teacher development. However, MGMP was not successful as a learning and professional community (Puslitjakdibud, 2020). Many teachers (Ditjen DIKDASMEN, 2021) in rural places could not easily participate in the TPD because most activities happened at the provincial level (Supriatna, 2011) and primarily relied on an in-person approach. Effective TPD in Indonesia should be near teachers' residences and properly utilize ICT. TPD is compatible with Indonesia since it can better address unique geographical and socio-cultural differences. Effective TPD in Indonesia must be local and maximize ICT capability.

PSF TLC provided learning opportunities to both permanent and non-permanent teachers. By improving their competencies and allowing them to earn credit through PSF TLC, non-permanent teachers had a better chance to become state-employed and increase the number of permanent teachers. By understanding the improvements and shortcomings of PSF TLC in terms of equity, quality, and efficiency, PSF TLC could support a diverse group of teachers to help them teach better. Consequently, students could learn more effectively. When PSF TLC is self-sufficient in more areas, government and non-government organizations can adopt the PSF TLC design to enhance their programs.

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The TPD@Scale Program: Design and Implementation

The TPD@Scale Construct

The TPD@Scale Coalition aims to help realize the UN's Sustainable Development Goal 4: Ensure inclusive and quality education for all and promote lifelong learning, "by promoting quality, equitable, and sustainable large-scale, ICT-mediated TPD through collaboration, research, and implementation support" (TPD@Scale Coalition, 2019). The TPD@Scale Coalition then outlined the envisioned TPD through the TPD@Scale construct based on accumulated theories and practices. The construct relies on Effective TPD, Learning@Scale, and Challenges in the Global South.

TPD@Scale understands that effective TPD needs to address six areas: content, active learning, teaching methodology, teaching modeling, expert support, and feedback in their programs (TPD@Scale Coalition, 2019). Learning from Learning@Scale's ongoing research, TPD@Scale understands that, to build TPD programs on a large scale while utilizing ICT, it must incorporate several learning platforms and environments such as massive open online courses (MOOC), open courseware, intelligent tutoring systems, and peer learning networks. Finally, TPD@Scale understands that challenges still exist in the Global South, where there are shortages of quality teachers, opportunities to access effective TPD, and schools nurturing various diversities such as gender, race, religion, and other differences.

Putera Sampoerna Foundation - School Development Outreach (PSF SDO) understands that providing quality education in every school requires capable teachers, who need accessible TPD programs to develop their competencies in subject mastery, teaching skills, and teaching motivation. Teachers perceive learning opportunities and support by providing education facilities and learning resources, and supporting environments focusing on content knowledge, teaching skills, and professional support (TPD@Scale Coalition, 2019).

PSF TLC as TPD@Scale

PSF SDO founded PSF TLCs in 10 regencies across Indonesia by 2020. After becoming a founding member of TPD@Scale Coalition, PSF SDO revamped its PSF TLCs, incorporating the TPD@Scale construct for a better scaling. Each PSF TLC develops its facilities, resources, and environment with local support according to the following three pillars of development:

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1. Governance system
2. Master teachers (MTs) and TLC leaders
3. Learning resources and infrastructures

Governance System: A sustainable organization needs a strong and transparent governance system. Governance here refers to the ability of TLC coordinators and MTs to run and manage a transparent, reliable, and independent non-profit organization, with the TLC governing TPD mechanisms and a system to ensure its sustainability. Independence here means TLC management and Master Teachers can raise funds.

Professional Human Resources: The organization recruits MT and TLC leaders for leadership roles to deliver all Professional Development (PD) activities, including but not limited to analyzing and addressing teachers' PD needs and conducting professional workshops. The MT and TLC leaders are expected to have an array of skill sets, including communication and organizational skills, to ensure the effectiveness of TPD activities. MTs should improve their skills in assessing teachers' needs, formulating these into action plans, translating them into TPD modules, and conducting TPD sessions (Figure 2). MTs should understand that there are always gaps in transitioning from one step to another, and these gaps may come from communication or other difficulties. The fewer the gaps, the more relevant the TLC is.

Figure 2. There are always discrepancies or gaps from one step to the next step, and the size of the accumulated gaps, from the teachers' actual needs to the TPD session realization, determine the effectiveness of needs analysis.

Actual Needs → Expressed Needs → TPD Modules → TPD Sessions
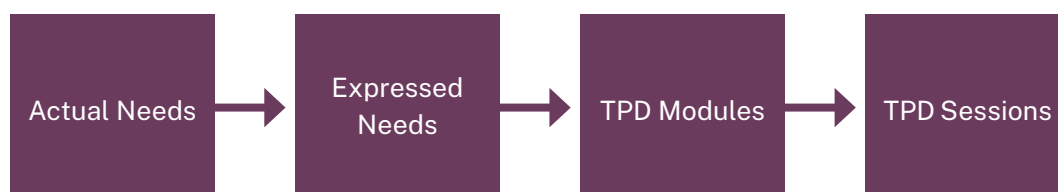
The second pillar also encourages TLC leaders to continuously improve their administrative skills like academic, managerial, and financial documentation. Properly documenting curricula, recruitment, and financial health, for example, will ensure the transparency and accountability of TLCs.

Learning Resources and Infrastructure: TLCs serve as centres enabling teachers to plan, develop, and tailor TPD programs based on local needs and building teacher networks. TLCs also provide internet access, books, reference materials, and instructional materials relevant for teachers' professional development. Providing relevant learning resources indirectly supports teachers to improve content mastery, active learning skills, and teaching methodology.

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As each TLC plays its role as a learning hub, each TLC needs to maintain the reliability of its knowledge management system. Each TLC needs to maintain the data server (for digital resources), manage the operation of the offline library (for paper-based resources), and maintain both physical (hardware, rooms, equipment, books, etc.) and non-physical (software, operating procedures, rules, data, etc.) infrastructures. In the public-private partnership envisioned by PSF, the local government would contribute learning resources and infrastructures.

PSF TLC in National Context

PSF SDO, local governments, and educators collaboratively built 10 PSF TLCs at the regency level. These learning centres operate under the national education system and directly work with the local government at the regency level. Figure 2 shows the relationship among educational institutions, teachers, students, TLCs, and PSF SDO and describes the relevant stakeholders and the relationships among them.

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Figure 3. The diagram shows the relationship among educational institutions, teachers, students, TLC, and PSF SDO. The diagram was inspired by Adey (2006, p. 55)
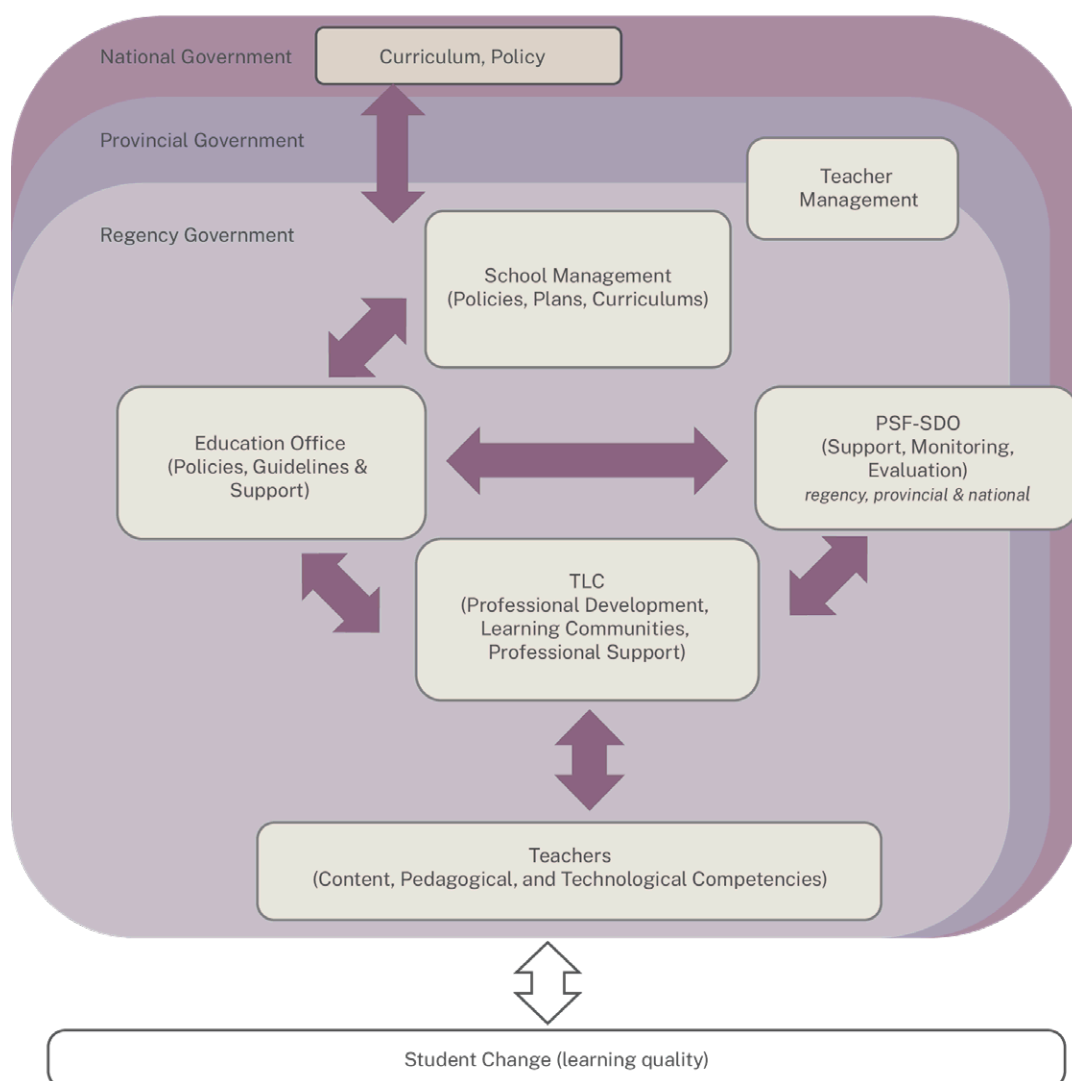
As indicated in Figure 3, the central and local governments oversee education matters, but each has its governance area. For example, all schools in Indonesia apply the same MoEC-developed curricula. Similarly, the MoEC makes general policies, plans, and curricula that local governments translate into day-by-day practices. The Research and Development Unit (Balitbang) in the MoEC designs the curricula and studies education policies. However, the local (provincial and regency) government handles the administrative issues relating to teachers, such as salary and school management. In effect, this situation gives more power to the regency education office. One should note that this shift of authority, from the central to the local government, is one of the consequences of the decentralization movement conducted after Indonesia's Reform Era.

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The directorate general of teachers and educational personnel (Ditjen GTK-Direktorat Jenderal Guru dan Tenaga Kependidikan) under the MoEC is responsible for formulating the national teacher professional development policies, action guidelines, and regulations. Through support, monitoring, and evaluation, PSF TPD@Scale assists the local PSF TLC to improve their activities in equity, quality, and efficiency. Subsequently, each PSF TLC needs to update the local government and other stakeholders constantly on its progress.

Improving teachers' competencies in content, pedagogical, and technology competencies will enhance the students' learning quality. In the TPD@Scale construct, the learning quality experienced by students is one of the ultimate and primary aims. As the diagram above shows, a student's learning and performance are outside the national teacher development policies, and PSF TLC does not directly connect to students. However, the learning experience and performance of students are the ultimate indicators of the effectiveness of any TPD program. Even though it may not observe students directly, PSF TLC should give sufficient attention to their progress. The absolute and ultimate measure of success in this overall PSF TLC design is when students and teachers master their learning and thinking skills to become lifelong learners.

Each PSF TLC may contribute to the recruitment of new and capable teachers as it provides every teacher who completes the TPD a certificate of participation and credit points, which can be used as a basis for promotion. More importantly, non-permanent teachers can benefit the most because they can use credit points and certificates to apply for permanent teaching positions.

Key Characteristics of the TPD@Scale Program

The synergy of effective TPD, Learning@Scale, the challenges in the Global South and the dimensions of equity, quality, and efficiency result in two key characteristics: personalization and localization. Personalization follows from the broad definition of Effective TPD and ICT utilization (exploited in Learning@Scale). Personalization allows teachers to customize their own professional development (i.e., training topics), which encourages them to be more responsible for their professional learning. The combination of the broad definition and ICT makes personalization feasible and reasonable. According to OECD, "Effective professional development is ongoing, includes training, practice, and feedback, and provides adequate time and follow-up support. Successful programs involve teachers in learning activities that are similar to ones they will use with their students and encourage the development of teachers' learning communities." (OECD, 2009, p. 49). The description suggests that effective TPD is an environment where teachers can learn continuously at their own pace with continuing professional support and guidance, even after formal training sessions. Therefore, effective TPD should enable teachers to personalize the development of their teaching competencies during and after and both inside and outside the programmed sessions, according to their unique situations, opportunities, and constraints.

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The learning and professional development process may also happen through formal or informal and offline or online activities. In this flexible setting, teachers engaging in PSF TLCs could and should personalize their learning and development process to their optimal benefits by incorporating ICT capabilities. Personalization in TPD@ Scale naturally embraces the diversity of teachers' traits, competencies, and needs. In traditional TPD, which relies on a face-to-face approach, personalizing the learning process is complicated and tedious. Here, ICT simplifies personalization. The present digital literacy gaps may hinder an ICT-mediated TPD, impacting only some teachers or those unable to participate actively in professional development activities. On one hand, TPD implementation must take digital gaps into account and assist teachers in personally adjusting the learning and TPD programs. By engaging teachers to search for learning resources and encouraging them to share teaching ideas using ICT, the digital literacy gaps among teachers may gradually diminish.

The second characteristic of the TPD@Scale program is localization, which implies three things: First, the TPD program independently managed at the regency level makes teachers travel less. Second, localization more easily provides teacher training, workshops, and other activities to fulfill teachers' needs. Third, localization allows the TPD program to conform to the differences in language and socio-cultural practices at each regency or district. Teachers may also have different traits at the individual level, such as employment status, gender, educational background, school types, etc. Acknowledging these individual differences, PSF TPD@Scale requires each PSF TLC to conduct needs analysis regularly. Master teachers and TLC leaders can use the analysis results to craft TPD modules and design activities.

Using needs analysis results will increase the relevance of TPD activities in TLC. Localization has consequences or prerequisites. Since all PSF TLCs are at the regency level, each PSF TLC needs to cooperate closely with the regency's government and other local stakeholders, such as donors and school management. The local education office (Dinas Pendidikan) and school principals are vital because teachers need their approval to participate or be MTs at a TLC. Localization also means MT and TLC leaders should utilize localassets and resources to ensure a program's efficiency. Furthermore, this could engage local stakeholders in TPD programs.

The TPD@Scale design encourages managerial and educational utilization of ICT. However, because of the digital literacy gaps among teachers, PSF TLCs are expected to introduce the technology, starting with the utilization of simple yet effective technology. For example, instant messaging applications such as Telegram and WhatsApp can help TLC leaders organize activities from announcement to evaluation. There are more sophisticated technologies, but the best technology should enable teachers to use them optimally. In the future, teachers are bound to use more advanced applications.

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However, at this stage, TLC aims primarily to help them become familiar and comfortable with learning technology and not be threatened by it. After this familiarization stage, they can gradually increase their confidence and skills in working with more sophisticated learning technologies. The introduction of learning technologies also helps teachers improve their teaching quality and create meaningful learning experiences for every student.

Continuous improvement cycles ensure sustainability. Each PSF TLC has a continuous improvement mechanism. After each session, MTs and TLC leaders evaluate participants. Evaluation could identify practices that may need adjustments. More importantly, these improvement cycles will nurture a quality culture among educators that affect the overall school environment.

Research Design and Methods

SAMPLING

This study applied a voluntary (non-probability) sampling approach to obtain quantitative and qualitative data from target teachers who participated in activities managed by three PSF TLCs in three regencies: Gowa, Karawang, and Kudus. The three TLCs were in three different provinces with different socio-cultural and geographical characteristics. While the Karawang TLC was still in the early stage, the Gowa and Kudus TLCs had been well established and self-sustained (without PSF intervention or PSF SDO supervision), giving valuable insights on their sustainability as independent TLCs.

In January 2021, PSF TPD@Scale sent electronic questionnaires to 1,000 teachers in the three regencies and received 326 valid responses. Then, in March 2021, PSF TPD@Scale sent teachers invitations to participate in one of three focus group discussions (FGD) in the three PSF TLCs. Each guided FGD had teachers from the respective regency. The number of respondents from Gowa, Karawang, and Kudus was 27, 30, and 34 persons, respectively.

DATA COLLECTION METHODS

The questionnaire was distributed via Google Forms, and PSF TPD@Scale sent the survey link to teachers via the three PSF TLCs.

From some preliminary findings from the quantitative data from the questionnaires, researchers formulated the questions for clarification and further investigation in the FGDs. Besides the above primary data, this study used secondary data from local and national databases to complement the data and provide a national perspective.

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DATA ANALYSIS

This study implemented quantitative and qualitative analysis, and it focused on examining the equity, quality, and efficiency of PSF TLC. In particular, the data analysis delved into the teachers' diverse traits and their responses to the PSF TLC's activities.

The female-to-male ratio in this voluntary questionnaire sample was 72% to 28%, and this ratio closely reflects the 2020/2021 ratio at the national level that was 70% to 30% (Ditjen DIKDASMEN, 2021). The actual female-to-male ratios in three regencies and the comparison with the national ratio are in Table 1 while the details of the respondents' demographics can be seen in Table 2.

Female to Male	Overall	Gowa	Karawang	Kudus
Actual Ratio	70:30 (National)	69:31	55:45	62:38
Sample Ratio	72:28 (3 Regencies)	82:18	58:42	68:32

Table 1. The female-to-male teacher ratio

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Respondents' Demography	National Demographics	Respondents' Demographics
Gender	• 70% Female • 30% Male	• 72% Female • 28% Male
Educational background	• NA	• 49.6% State University • 50.4% Private University
	• NA	• 93.9% Education (Teaching) Majors • 6.1% Subj. (Non-teaching) Majors
	• NA	• 82.4% Regular University • 17.6% Open University
Employment Status	• 78% State-employed • 22% Private Institution-employed	• 82.6% State-employed • 17.4% Private Institution-employed
	• 77% Permanent • 23% Non-permanent	• 81.1% Permanent • 18.9% Non-permanent

Table 2. Respondents' Demography. The employment status data were from Lokadata (2021).

Table 3 below details the distribution of the respondents in the focus group discussion/interview sessions (FGD).

Type of Respondents	Gowa	Karawang	Kudus
TLC Management	6	7	7
Master Teachers	10	12	14
Edu. Office Reps.	1	1	1
Teachers	10	10	12
Total	27	30	34

Table 3. Type of respondents' roles in FGD

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This study searched for possible correlations between the teachers' demography variations and the teaching-learning process in the classrooms. When applying Pearson's or Fisher's Chi-Square test for finding correlations, this study found that the assumptions of the asymptotic method in several cases were unmet. Facing this situation, we supplemented the test with the exact calculation method as "the exact calculation always produces a reliable result, regardless of the size, distribution, sparseness, or balance of the data." (Mehta & Patel, 2013)

Let x be an $r \times c$ crosstab (or contingency table) actually observed and y be the generic $r \times c$ crosstab notation that belongs to some well-defined reference set of $r \times c$ crosstabs. Thus, following Mehta and Patel's notations, if m_i denotes the i-th row margin sum and n_j denotes the j-th column margin sum, the reference set Γ is defined as

$$\Gamma = \left\{ y \mid y \text{ is } r \times c; \sum_{j=1}^{c} y_{ij} = m_i; \sum_{i=1}^{r} y_{ij} = n_j \text{ for all } i,j \right\} \tag{1}$$

Then, if N denotes the sample size, the probability of observing any y in Γ can be computed as

$$P(y) = \frac{\prod_{j=1}^{c} n_j! \prod_{i=1}^{r} m_i!}{N! \prod_{j=1}^{c} \prod_{i=1}^{r} y_{ij}!} \tag{2}$$

After that, the exact two-sided p value is defined as

$$p_2 = \sum_{FI(y) \geq FI(x)} P(y) = Pr\{FI(y) \geq FI(x)\} \tag{3}$$

Here, $FI(*)$ denotes the (Fisher's) test statistic of the crosstab *, where * can be replaced by x or y. The Fisher's test can be replaced by the Pearson's test. Thus, the above formula means "the sum of null probabilities of all crosstabs in the reference set Γ that are as extreme as the observed table x". The value $FI(x)$ is calculated by the following formula:

$$FI(x) = 2 \log \log (\gamma P(x))$$

and

$$\gamma = (2\Pi)^{\left\{\frac{(r-1)(c-1)}{2}\right\}} N^{\frac{-(rc-1)}{2}} \prod_{i=1}^{r} (m_i)^{\left\{\frac{(c-1)}{2}\right\}} \prod_{j=1}^{c} (n_j)^{\frac{(r-1)}{2}}$$

Then, the exact p value is calculated from (3) as the probability $Pr(FI(y) \geq FI(x)|y \epsilon \Gamma)$. Computing Equation (3) is not easy, because the size of the reference set Γ grows exponentially. Facing this difficulty, Exact Tests use the network algorithms.

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Impacts of the TPD@Scale Program on Equity, Quality, and Efficiency

IMPACTS ON EQUITY

More than 9,325 teachers from early-childhood up to high-school education levels participated in the three PSF TLCs from 2018 until 2020. This study examined how PSF TLCs served teachers with great diversity, from gender, language, employment status, educational background, and IT mastery.

In 2020, there were 59 activities in Gowa and Kudus and 5,530 participants (see Table 4), but since the PSF TLC in Karawang was still in the initiation stage, the data were not available.

2020	Gowa	Karawang	Kudus
# Sessions	28	NA	31
# Participants	1767	NA	3763

Table 4. The number of activities and participants in 2020

All activities managed by PSF TLCs were inclusive and accessible to teachers of all genders. Moreover, since each PSF TLC was at the regency level, teachers could use both national and local languages in the activities and forums. Local language utilization made TLCs more accessible and inclusive, and teachers became more confident in communicating their ideas.

Most teachers (97%) surveyed in this study perceived the participation costs as affordable. This affordability is crucial in the present Indonesian teacher situation because even the non-permanent teachers, who did not have financial security, could access the TPD programs, making PSF TLCs accessible and inclusive to teachers with different employment statuses. In the bigger picture, PSF TLCs provided a feasible scheme for non-permanent teachers to secure their jobs and become permanent.

Effective TPD also requires flexibility in adapting to different challenges, one of which is geographical in nature. As such, TLCs were designed to serve teachers between and within the regencies, cities and/or provinces, applying three approaches: (i) Face-to-face training in TLCs and schools to overcome the geographical issues. This approach allows teachers to have professional development at ease, without having to travel and leave their classes for days to obtain PD. (ii) Online training within the TLCs located across provinces and/or regencies, allowing TLCs and teacher-participants to learn from other TLCs through

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the utilization of ICT. (iii) Hybrid training, a combination of face-to-face and online training for teachers with better internet connection.

These three approaches could be a reference model for other regencies considering the geographical issues, culture, and the internet availability and reliability in the different areas. The following is the summary of approaches implemented in the three regencies.

Consideration	TLC Gowa (South Sulawesi)	TLC Karawang (West Java)	TLC Kudus (Central Java)
Availability of Internet connection (number of villages receiving cellular phone signal with weak connection)	639 out of 2,345 villages	748 out of 5,947 villages	930 out of 8,553 villages
Proportion of individual using internet)	43.91	53.94	47.74
Approach	Face-to-face training in TLC and schools	Hybrid training: Face-to-face trainings in TLC and schools and online training	Hybrid training: Face-to-face trainings in TLC and schools and online training

Table 5. Summary of approaches implemented in the three regencies

Though PSF TLC was inclusive and accessible to all teachers of different employment statuses, sharing ICT in a digitally divided community of teachers was more problematic. The digital literacy gaps among the teachers and the internet infrastructure limitations in the schools or areas persisted at the regency level. By understanding and respecting the digital division, PSF TLC tapped and adopted ICT at various levels, from simple communication technology such as instant-messaging applications to more sophisticated integrated learning management platforms like Schoology, Office 365, and Google Workspace (formerly G Suite). This fundamental strategy enabled both senior and junior teachers to collaborate actively in ICT-mediated activities. PSF TLC provided teachers with learning opportunities in ICT areas by offering various workshops and forums on utilizing this broad spectrum of technologies in learning and teaching. ICT adoption and workshops helped PSF TLC strengthen inclusivity and accessibility in a digitally divided community of teachers.

IMPACTS ON QUALITY

While the existence of TLCs serve to achieve more equity by providing access to professional development, TLCs serve the purpose of quality training. TPD@Scale incorporated the Darling-Hammond et al. (2017) principle of effective TPD, and TPD@Scale explicitly stated the need for TPD activities to (TPD@Scale Coalition, 2019):

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1. Be content-focused
2. Incorporate active learning
3. Support collaboration, typically in job-embedded contexts
4. Use models and modeling of effective practice
5. Provide coaching and professional support
6. Offer opportunities for feedback and reflection
7. Be of sustained duration

By inspecting the list of the 2018-2020 TLCs' activities, this study identified four out of 59 sessions discussing teaching content, namely the Indonesian language, creative writing, social studies, and essay writing. This finding suggested that TLCs had not addressed the first feature (being content-focused) in the TLC activities. Despite that, the PSF TLCs' activities had sufficiently incorporated the 2nd up to 7th features during and after the sessions. Notably, the teachers found that the coaching and professional support provided by TLCs helped improve the instruction they were able to produce.

Most teachers reported that they applied the new ideas they learned from the TPD into their classes, with the greater number saying that they could implement the TPD teaching ideas in their classes seamlessly. Gender, age, and educational backgrounds were non-issues in classroom implementation. Nevertheless, state-employed teachers perceived TPD modules as more suitable to their needs, more than how their privately-employed counterparts saw them.

This study next delved into the students' learning engagement and found that most teachers (84%) observed some improvements in the students' learning engagement. Despite that, among the teachers' traits (gender, residence, educational background, and employment status), this study found that employment status (being employed by state or by private institutions) was the most determining factor in seeing TPD module appropriateness and the students' engagement. This study initially suspected that educational background was a key determining factor, but the quantitative analysis did not support it.

This study found two significant statistical relationships: The first significant relationship showed that the teachers employed by private institutions tended to observe a notably higher number of students, who improved their engagement due to the use of the training materials.

Considering how PSF TLC had equally served all teachers with different employment statuses, the learning-engagement difference might come from factors outside PSF TLC. One possible explanation is that a school's quality culture always plays a prominent role in student learning engagement. One school quality culture that impacts professional development is the sense of learning. Private school teachers tend to be more motivated to learn since their performance is evaluated regularly, leading to the benefits they will obtain as employees. Remuneration and, thus, the correlation between student engagement and employment status was possibly due to the schools' cultural differences.

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The second significant relationship showed that the state-employed teachers tended to perceive the TPD modules offered by PSF TLCs as more appropriate than did their counterparts employed by private schools or institutions. The different cultures and situations in schools might explain these different perceptions.

This study had a shortcoming in uncovering a significant relationship between the teachers' educational background difference (education majors versus subject majors) and the perceived appropriateness of the training content or materials. The insufficient number of questionnaire respondents from the subject (non-education) majors was likely one of the reasons. Thus, any future study needs to gather more samples from the non-teaching majors.

Some interviewees in the qualitative study stated the significance of educational background in perceiving and evaluating the appropriateness of the TPD modules. This information suggested that, in addition to improving the sample size and questions in the survey, future studies should look into the effectiveness of the needs analysis. It should look deeper into possible discrepancies from the actual teachers' needs to those formulated by the MTs, from the formulated needs to the training module designs, and from the module designs to the training realization.

This study found that PSF TLC changed teaching practice and attitudes. Some teachers said their instructional materials became less monotonous after implementing the new teaching ideas. Others reported some improvements in their confidence, creativity, and motivation, as shown in some shared video clips of how they shared their innovative teaching strategies with other teachers and the public. More importantly, some reported that their students were now more engaged in their lessons, with some students showing a considerable change in their learning attitudes and habits. Even during the pandemic, when learning moved online, the students maintained their learning habits.

From the interviews, it was apparent that teachers developed their teaching competencies and career by participating in PSF TLC. In some cases, some education organizations recognized the expertise of these teachers and formally elected them as Master Trainers at the regency and national levels. In other cases, many teachers nurtured specific skills and interests relating to class management and IT for their own sake. They were willing to gain new knowledge and skills even without formal recognition. This finding is important and showed how PSF TLC had opened various avenues of teacher development at the personal level and not just limited to formal recognition. Here are some of the teachers' career and skill improvements reported during the FGDs.

Gowa	Teacher A	A felt she was recognized by the education community, for she often got assignments to share her knowledge and experience.
	Teacher B	B shared how excited and thankful some teachers were for becoming MTs.
	Teacher C	C said that two MTs became school principals, and some others had exhibited the potential for being so.
	Teacher D	D conducted internal weekly TPD sessions in her schools.
	Teacher E	E developed expertise in Microsoft 365 in education and became a nationally known education trainer beyond the Gowa regency.
	Teacher F	F developed interests and skills to create instructional videos, and she shared them publicly. She said her videos were perceived positively by students and their parents.
	Teacher G	G developed her skills and interests in utilizing ICT-mediated learning facilities, such as designing assessments in Google Forms and creating instruction modules in Google Slides.
Karawang	Teacher E	E admitted that being a Master Teacher helped to build her confidence. Her peers and supervisors now seek her advice on professional and school development.
	Teacher F	F found that his students' learning outcomes improved, and some of the students even won the Chemistry Olympiad.
	Teacher G	G mentioned that most Master Teachers from TLC Karawang were promoted to School Principals, a positive impact on their careers.
	Teacher H	H obtained positive feedback from her students since she became a Master Teacher, and her students found the learning process more enjoyable, meaningful, and engaging.
Kudus	Teacher I	I rediscovered his interest in writing.
	Teacher J	J found opportunities to learn public speaking..
	Teacher K	K developed class management skills and found teaching more enjoyable.

Table 6. Teachers' career and skill improvements as reported during FGDs

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IMPACTS ON EFFICIENCY

The emphasis on the need for localizing PSF TLCs at the regency level resulted in saving teachers travel cost and time, as they didn't need to travel outside their regencies, with the minimal travel time also facilitating the teaching-learning process as it was unlikely that teachers would be late for their classes. Thus, localizing PSF TLC improved the efficiency of the TPD time and cost and, at the same time, reduced students' learning loss.

The Kudus PSF TLC was well-off because the Kudus government had allocated sufficient funds for teachers participating in TLC. However, the Kudus regency government insisted that teachers and their schools needed to bear a small amount of the training fee, arguing that all teachers should nurture the notion that since attending TPD programs was for their benefit, there was direct investment in it aside from time spent.

This study found that most well-managed schools encouraged and fully supported their teachers participating in PSF TLC activities. These schools considered the TPD program in PSF TLC a valuable opportunity to improve the quality of their schools and the training fee as cost-effective. However, their counterparts in other schools did not have that luxury. PSF TLCs should examine these unequal supports and find some other means to overcome them.

Utilizing school and government facilities to conduct TLC activities appreciably increased the TPD program's cost-effectiveness. To maintain these facilities, PSF TLCs needed to develop close working relationships with local stakeholders. Moreover, ICT utilization in TPD activities greatly reduced the cost and improved the effectiveness of their TPD programs.

Sustaining and Scaling the TPD@Scale Program

TPD's localization and ICT utilization were crucial factors in sustaining and scaling the TPD@Scale program. Localization enabled each TLC to maintain its relevance, and replication in another regency could be rather straightforward. At the same time, ICT-mediated TPD could overcome the geographical constraints faced by many teachers in Indonesia.

The year 2020 should convince doubtful educators and government officials on the roles of ICT in TPD and education future. This study observed the three PSF TLCs shifted from in-person to online activities during the pandemic. In Gowa and Kudus, the professional development activities were sustained in 2020. The fact that the PSF TLC could still conduct workshops and seminars in a difficult time was clear evidence of its sustainability.

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Some MTs of PSF TLC in Kudus expanded their influence on the provincial level and formed collaborative networks with other TPD institutions. For example, the local teacher working group and MGMP frequently invited some master teachers to act as trainers in their programs. Localization enabled each PSF TLC to propose unique and straightforward solutions to local problems. For example, facing the digital infrastructure gaps in the regencies, some master teachers changed the training approach from online to in-person activities in areas with insufficient reliable internet access. In 2020, some master teachers and the teachers in the Tompobolu district in Gowa created a learning design suitable for schools in unconnected places.

Even before COVID-19, the MTs and TLC leaders had exploited instant messaging applications such as WhatsApp and Telegram as platforms to conduct online learning classes and share relevant resources. These virtual forums provided valuable environments to discuss problems or issues teachers faced. TLC did various online training sessions when the pandemic hit Indonesia, and physical distancing was enforced. Besides the online conference applications like Zoom, the two instant messaging applications were instrumental in conducting training sessions, distributing learning resources, and managing the teaching-learning process.

The unprecedented 2020 crisis made simple message-based communication and video-based discussion platforms integral to education and TPD. This fact demonstrated one of the guiding principles for using technology in learning: the best technology is that which teachers can utilize optimally. According to the Ten Guiding Principles for the Use of Technology in Learning (2020), technology should primarily focus on pedagogy and always acting in aid of learning. Sophisticated technology may not always be beneficial since some learning technologies were not initially developed for education.

ICT utilization by PSF TLC influenced teachers to incorporate ICT in teaching and learning. Gowa and Kudus teachers reported that half of them utilized ICT in their assessment process. Moreover, the instant messaging applications allowed them to communicate with their students and other educators. With ICT, teachers partially solved geographical problems and simplified their classroom management and professional development. Learning and teaching development in ICT-mediated platforms was a good sign of the future role of ICT in making TPD accessible to teachers everywhere and making it cost-effective.

Conclusion and Implications

SUMMARY OF KEY FINDINGS

The three PSF TLCs in Gowa, Karawang, and Kudus implemented the TPD@Scale construct in their activities and showed substantial impacts on the TPD's dimensions of equity, quality, and efficiency. More importantly, by helping more than 9,000 teachers to improve their teaching competencies, these PSF TLCs indirectly enhanced students' learning in their engagement and habits.

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This study found that teachers with diverse traits, residential situations, cultural and educational backgrounds, digital skills and infrastructures, and employment statuses equally benefited from the TLCs. Notably, the localization and personalization of PSF TLC combined with multi-level ICT utilization enabled a diverse group of teachers to improve their ability to teach. Teachers traveled less, saved on time and cost and, eventually, reduced students' learning loss. Localization and personalization also made PSF TLC more relevant to the regency because it could address teachers' needs at the regency and personal levels. Moreover, PSF TLC's strategy to harness ICT power at varied levels was suitable in a community of teachers with wide digital literacy and infrastructure gaps.

Even though PSF TLC served diverse teachers well, the teachers' being employed by either the state or private institutions directly influenced the appropriateness of the training material and the resulting student learning engagement. State-employed teachers tended to perceive the training materials as more appropriate to their needs, and private-employed teachers observed more students improving their learning engagement. The quantitative and qualitative findings showed that PSF TLC should scrutinize the actual expectations of privately-employed teachers and teachers from non-education majors. PSF TLC should conduct needs analysis and give more attention to these two groups of teachers.

The unprecedented ICT utilization in PSF TLC's activities and forums in 2020 substantially transformed teaching and learning practices, bringing them to a new level of digital education. Teachers increased their use of ICT to deliver their instruction and distribute assignments to students, and students used ICT to communicate with their teachers and other students. This situation proves that scaling up ICT-mediated TPD and education modeled by PSF TLC in Indonesia was feasible.

IMPLICATIONS FOR PRACTICE AND SCHOLARSHIP

The realization of the TPD@Scale construct contributed to the general study of TPD design and pursuing equity, quality, and efficiency. In particular, TPD programs in other Global South countries may incorporate the accumulated knowledge based on PSF TLC's experiences conducting TPD activities in localized and personalized settings with the varied intensity of ICT utilization. From the collected experiences, TPD designers could look into how to help teachers to personalize their learning and professional development, noting that the flexibility of a TPD program is necessary in providing quality learning experiences for teachers.

In Indonesia, different regency governments and local non-governmental organizations could adopt the PSF TLC model into their regencies, even if they face more geographical challenges and wider digital gaps. Educators and decision-makers can learn from the accumulated knowledge in PSF TLC on building a community of continuously-learning teachers in remote areas. They could look at the success and shortcomings of PSF TLC in creating a learning culture among the education communities.

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For the national teacher development policy, decision-makers could delve into the role PSF TLC played in facilitating further learning for non-permanent teachers, which led to their improved employment status. This can be a means to recruit capable teachers, helping to increase the number of active teachers.

FUTURE RESEARCH

Future research should examine the impacts of TPD on the actual teaching-learning quality and equity in classrooms, examining the following three elements: the teachers, the students, and classroom interaction.

Teachers: Research should examine teachers' improvement in reading and numerical literacy skills, as assessed in the 2021 National Assessment. More than merely testing their knowledge on various teaching strategies, future research should examine their ability to integrate teaching strategies into specific lessons.

Students: Future research should directly assess their readiness as lifelong learners by measuring their learning skills, engagement, and habits. Then, the research should examine actual student performance in reading and numerical literacy.

Classroom Interaction: Future studies should examine the depth and intensity of the teacher-student and student-student interactions in classrooms, as high-quality learning for all students would be the ultimate measure of TPD's impact. Moreover, subsequent research should evaluate the progress of teachers' ICT utilization while participating in TPD programs. After that, it should examine the correlation between ICT progress and the impacts on students' and teachers' learning quality, equity, and efficiency.

This future three-element research would add noteworthy insights to the TPD and teacher education body of knowledge and improve the TPD@Scale implementation at PSF TLCs.

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About the Authors

Iwan Pranoto is a mathematics professor at Bandung Institute of Technology, Bandung, Indonesia. He obtained his Ph.D. in mathematics from the University of Toronto, Toronto, Canada, in 1994. Besides teaching, he assists schoolteachers through various professional development programs. His research interests include general mathematics, education, geometric control, and the history of mathematics. He is a member of the Indonesian Mathematical Society.

Juliana is the Head of Development & Program of Putera Sampoerna Foundation-School Development Outreach (PSF-SDO). Prior to her appointment in PSF-SDO, she served as a teacher and Head of Curriculum in some schools in Indonesia for 10 years. She has engaged with teachers and schools in mostly outreach areas across Indonesia, providing consultancy and workshops at all levels of education and in the community, including the local governments. Juliana led the development of three flagship programs of PSF-SDO: Lighthouse School Program, Teacher Learning Centre, and Guru Binar.

Wardatul Hasanah is an assessment and evaluation staff of Putera Sampoerna Foundation-School Development Outreach (PSF-SDO). She has an interest in research activities. The main focus is on education issues, mainly for marginalized groups. Her past research was related to literacy skills in the low socio-economic group. She is also a member of the Education Research Cluster of the Faculty of Social Politics, University of Indonesia.