



Community Engagement Program for School Teacher Groups Using SiPETA to Support Children with Learning Difficulties in Depok, West Java

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ABSTRAK

Pengembangan sumber daya manusia menjadi fokus utama Rencana Pembangunan Jangka Menengah Nasional (RPJMN) 2020–2024 yang menekankan pentingnya pendidikan berkualitas sejak usia dini. Di Kota Depok, ketimpangan pendidikan dan rendahnya capaian *Programme for International Student Assessment* (PISA) pada aspek membaca dan berpikir kritis menunjukkan perlunya intervensi yang terarah. Program pengabdian masyarakat ini bertujuan meningkatkan kompetensi guru sekolah dasar dalam mendukung siswa dengan kesulitan belajar melalui pemanfaatan SiPETA (Sistem Pelatihan Otak), aplikasi digital berbasis pelatihan otak yang dirancang berdasarkan Taksonomi Bloom untuk meningkatkan kemampuan membaca, perhatian, memori, regulasi diri, dan berpikir kritis. Program dilaksanakan melalui pelatihan terstruktur bagi guru sekolah dasar yang kemudian mengimplementasikan SiPETA kepada siswa dengan kesulitan belajar. Kegiatan mencakup pelatihan terpandu, penerapan di kelas, serta evaluasi pada bulan pertama dan ketiga. Hasil menunjukkan peningkatan kompetensi guru, dengan skor efikasi meningkat 31% dan skor pengetahuan 40%. Program ini memperkuat kapasitas guru dan mendukung pencapaian *Sustainable Development Goal* (SDG) 4: *Quality Education* tentang pendidikan berkualitas.

Kata kunci: *Digital intervention; Kesulitan belajar; Pelatihan guru; SiPETA; SDG 4*

ABSTRACT

Human resource development is a primary focus of the 2020–2024 National Medium-Term Development Plan (RPJMN), which emphasizes the importance of quality education from an early age. In Depok City, educational inequality and low achievement in the *Programme for International Student Assessment* (PISA) in reading and critical thinking indicate the need for targeted intervention. This community service program aims to improve the competence of elementary school teachers in supporting students with learning difficulties through the utilization of SiPETA (Sistem Pelatihan Otak), a digital brain-training application designed based on Bloom's Taxonomy to enhance reading skills, attention, memory, self-regulation, and critical thinking. The program was implemented through structured training for elementary school teachers, who subsequently applied SiPETA to students with learning difficulties. The activities included guided training, classroom implementation, and evaluations conducted in the first and third months. The results showed an improvement in teacher competence, with efficacy scores increasing by 31% and knowledge scores by 40%. This program strengthens teacher capacity and supports the achievement of Sustainable Development Goal (SDG) 4: *Quality Education*.

Keywords: *Digital intervention; Learning difficulties; Teacher training; SiPETA; SDG 4*



INTRODUCTION

Education in Indonesia still faces many challenges. Based on the 2022 PISA results, only 22.9% of students achieved the minimum level in reading. This condition shows that reading ability among Indonesian students is still low. In schools, teachers can see directly that some students have difficulty understanding written material and following learning activities.

Students with learning difficulties are more at risk in this situation. They usually need more time to follow the lesson and sometimes struggle to meet the academic expectations for their age (Cortés Pascual *et al.*, 2019). When this situation continues, students may start to feel discouraged, and in some cases their frustration can appear in the form of behavioral or emotional difficulties (Crone, 2017). In many situations, these learning challenges are closely connected to attention, memory, and self-regulation (Nesayan, 2019). These abilities influence how students participate in class, respond to instructions, and complete tasks. Even so, teachers are often expected to manage these problems without having received specific training on executive function difficulties. In public schools, especially in lower-income areas, the number of students in one class is often high, and access to specialists is limited. Because of this, support for students with learning difficulties is sometimes not optimal.

One of the efforts carried out in this program is the introduction of SiPETA (Sistem Pelatihan Otak). SiPETA is a digital application that can be used daily in student learning. The design based on Bloom's Cognitive Taxonomy, but it is presented in a simple way through short, illustrated stories. Students read the stories and answer questions that require them to think at different levels, starting from understanding the content and continuing to more complex tasks such as analyzing and creating (Dewi *et al.*, 2024a). Research conducted previously showed that the use of SiPETA was associated with improvements in students' cognitive performance in school (Dewi *et al.*, 2025).

SiPETA did not appear suddenly. It was developed after several earlier community programs in 2021 and 2023 that focused on attention, memory, and self-regulation training. In those earlier activities, the SBAR approach (Attention, Memory, and Self-Regulation) was used as the main framework. The results showed that teachers understood the material better, and students demonstrated improvements in self-regulation (Dewi *et al.*, 2023). The current program continues this approach in a more structured digital format.

In this activity, teachers participate in training sessions before applying the application with their students. The training consists of several stages and includes evaluation so teachers can observe student progress more clearly. This program is also in line with national and local efforts to improve education quality, including Sustainable Development Goal 4 on quality education and local development priorities in Depok City.

The main objective of this program is to help teachers better identify and support students with learning difficulties through the use of the SiPETA digital application. Through this training, teachers are expected to gain practical experience and confidence in using cognitive-based strategies to support reading skills, attention, memory, self-regulation, and critical thinking in the classroom.

IMPLEMENTATION METHOD

This community service program involved partner groups who are economically and socially less productive, with the main issues identified as the quality of education and the utilization of digital technology in schools. The program aimed to provide solutions to these challenges by training teachers to utilize a digital application for brain training, namely SiPETA, which is designed to serve as a tool for enhancing students' learning abilities in schools. Thirteen teachers were involved in the SiPETA training to support children with learning difficulties.

The implementation of the program focused on the transfer of science and technology (IPTEKS) through the introduction of a digitalized brain training application. The application integrates several components, including digital intervention modules, cognitive learning video tutorials, and teacher-oriented instructional videos. The utilization of this application is intended as an innovative method of brain training that leverages digital systems. The process was carried out through the following stages: Training in the basic knowledge of application use, Screening or assessment for brain training, Cognitive learning sessions for brain training, Evaluation of learning outcomes, and Reporting of final results.

In the stage of technology transfer (IPTEKS), the users involved included both teachers and students. Teachers were provided with basic training on the utilization of the digitalized application and its functions so that they could, in turn, transfer knowledge to their students. The learning outcomes of teachers' application use were monitored by the program implementers to evaluate the achievement targets of each teacher. In addition, teachers' level of understanding was observed to determine whether it met the expected standards. Once teachers demonstrated adequate understanding and operational ability in using the digital application, the next stage involved classroom-based learning activities conducted by teachers with their students.

The learning process, which consisted of knowledge transfer from teachers to students, was carried out by utilizing the web-based SiPETA digital application. The implementation followed these steps: Organizing students in a conducive learning environment, Providing basic knowledge of computer operation, Delivering training on the use of the SiPETA digital application, and Giving instructions for completing assessments through SiPETA.

In general, the transfer of science and technology in this community service program included the following components: Transfer of knowledge in the field of technology, Transfer of knowledge in the field of brain performance, Transfer of skills

in operating digital technology, Transfer of skills in enhancing attention, memory, and concentration, and Transfer of skills in brain management.

The next stage involved the design process of the SiPETA digital application, which was carried out through surveys and interviews with partner schools. After the problem identification stage was completed, the community service activities continued by assessing teachers' understanding of the basic concepts of the SiPETA training. Subsequently, a training program was conducted for teachers using a training-of-trainers approach, facilitated by the experts involved in the project.

This community service program was carried out from September to December 2025, involving 13 elementary school teachers in Depok. The activities took place at one public school or elementary school in Depok was selected because the school's condition was considered quite concerning. In addition, the teachers had not yet developed adequate understanding in addressing students with learning difficulties, such as problems in reading, mathematics, or low intellectual abilities, which should receive special attention within an inclusive education program.

Data collection in this activity was carried out using pre-test and post-test questionnaires. The pre-test was administered before the program began, while the post-test was given after the program was completed. By comparing the two results, it was possible to determine the extent of participants' improvement in their knowledge of the SiPETA application. After the training, an evaluation was conducted to assess teachers' skills and understanding in delivering SiPETA, in order to ensure their readiness to implement the application. This process was regularly supervised by the implementation team to monitor the program and to evaluate students' cognitive changes, both in the first month and in the third month.

The researchers collected data during the program through observation, comprehension tests, and questionnaires administered to participants. The evaluation of the program was conducted after the series of activities had been completed, with the following details: The first evaluation was carried out one month after the training by comparing the improvement in thinking functions with the level prior to the training. The second evaluation was conducted in the third month by comparing the improvement in thinking functions from the second evaluation with the first evaluation.

RESULTS AND DISCUSSION

Based on interviews with partner representatives, it was found that some students experienced learning difficulties, as well as symptoms of hyperactivity, lack of concentration, and challenges in reading and understanding sentences. In addition, there were several students who exhibited aggressive behavior that disrupted the learning environment in the classroom.

Table 1. Demographic Characteristics of Teacher Participants

	Category	%
Gender	Male	39%
	Female	61%
Education	Upper Secondary School	11%
	D3	11%
	S1	77%
	S2	11%
Teaching Experience	1-10 years	38%
	11-20 years	38%
	21-30 years	8%
	>30 years	16%

Based on Table 1, the participants of this community service activity were teachers who attended with diverse educational backgrounds, teaching experiences, and professional roles. In terms of gender, the majority of participants were female (61%), while male participants accounted for 39%. Regarding the highest level of education, most teachers had completed a bachelor's degree (S1) at 77%, and a smaller proportion had pursued postgraduate studies (S2) at 11%. Additionally, 11% of participants held a senior high school (SMA) qualification, and another 11% held a diploma (D3). These findings indicate that the majority of teachers possessed the academic background required for the teaching profession at the elementary school level.

Based on teaching experience, the largest groups of participants were those with 1–10 years and 11–20 years of experience, each accounting for 38%. Furthermore, 16% of participants had more than 30 years of teaching experience, while 8% had between 21–30 years. These findings indicate that the majority of participants were teachers with moderate teaching experience, although there were also a number of senior teachers with more than 30 years of service.

The community service activity was carried out through several structured and systematic stages. Each stage was facilitated by competent parties to ensure that the process ran optimally. Participants received theoretical materials aimed at enhancing their knowledge of the importance of addressing learning difficulties among students and the use of the SiPETA application. In addition, they were provided with hands-on practice sessions to develop their skills in operating the SiPETA application. The following is the documentation of activities conducted during the SiPETA application training program:



Figure 1. (a) Documentation of SiPETA Training Activities, (b) Practice SiPETA application, (c) Group photo with participants and facilitators after the training session.

The implementation of the community service activity demonstrated a high level of teacher participation when introduced to the SiPETA application. Teachers did not merely receive explanations passively but were actively engaged in every session. During the presentation on how to use the application, they carefully and systematically followed the instructions to fully understand the workflow. This activity was further enriched by collaborative interactions, in which teachers discussed the steps taken and supported one another in responding to the questions provided through the application. Such active involvement reflects the teachers' strong motivation to comprehend the material while simultaneously enhancing their competencies through the utilization of the SiPETA application.

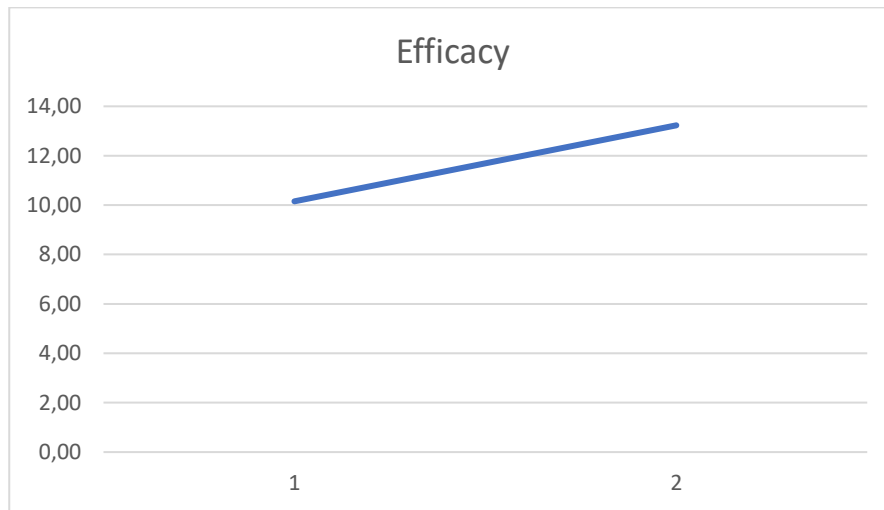


Figure 2. Teacher Efficacy Scores Before and After the Training

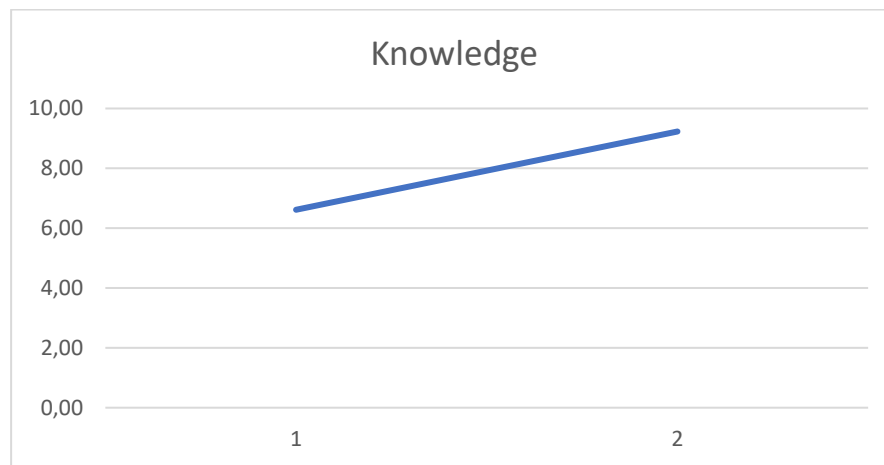


Figure 3. Teacher Knowledge Scores Before and After the Training

The results of pre-test and post-test indicated an improvement in teachers' understanding, both in terms of efficacy and knowledge related to the SiPETA application. The Efficacy Scale used in this study was designed to measure participants' self-confidence in utilizing the SiPETA application. The scale consisted of several statements reflecting key aspects of efficacy, namely self-confidence in independently operating the application, confidence in employing the application for cognitive purposes, confidence in program integration, and confidence in addressing potential obstacles. Each item was rated on a four-point Likert scale, ranging from "strongly disagree" to "strongly agree," where higher scores indicated a higher level of efficacy in using the SiPETA application. In terms of efficacy, the average pre-test score of 10.15 increased to 13.23 in the post-test, reflecting an improvement of approximately 3.08 points, with an average percentage increase of 31%. These findings suggest that following the intervention, participants reported greater confidence in their abilities.

The Knowledge Scale was employed to measure participants' understanding of the SiPETA application. This instrument consisted of 10 multiple-choice questions, each designed to assess important comprehension of fundamental concepts related to

SiPETA, including what it covers, foundations, core skills being trained, target users, device requirements for access, procedures for accessing the application. The findings from this study demonstrate substantial improvements in both teacher efficacy (31% increase) and knowledge (40% increase) following the SiPETA training intervention. The efficacy scores reflect improved teacher confidence in independently operating the application, employing it for cognitive purposes, integrating it into their programs, and addressing potential obstacles. These results align with and, in some domains, exceed outcomes reported in previous digital training and cognitive intervention studies.

Our findings are supported by previous studies showing that ICT integration enhances the quality of the teaching–learning process and is significantly associated with teachers’ technological pedagogical content knowledge and technological competencies (Aslam et al., 2021). Structured professional development programs that emphasize hands-on practice with educational technology have also been shown to significantly improve teachers’ self-efficacy and pedagogical competence (Tondeur et al., 2017). Furthermore, training programs that combine theoretical instruction with practical application yield greater improvements in teacher confidence compared to purely theoretical approaches (Schmid et al., 2020).

The collaborative learning approach applied in this program, in which teachers discussed procedures and supported one another, is consistent with evidence that peer collaboration during professional development promotes deeper understanding and sustained technology integration (Prestridge, 2017). The 40% increase in knowledge scores observed in this study is also in line with findings indicating that targeted training in digital cognitive applications significantly enhances educators’ knowledge (Delcker & Ifenthaler, 2021). Additionally, the transition from face-to-face to digital learning environments during the COVID-19 period has been shown to strengthen teachers’ and students’ technological skills through increased exposure to digital tools and platforms (Abid et al., 2021).

CONCLUSION AND SUGGESTION

The SiPETA training was carried out with 13 elementary school teachers in Depok. The activity introduced how to use the application in supporting students with learning difficulties. From the pre-test and post-test results, teachers’ self-efficacy increased by 31% and their knowledge increased by 40%. This shows there was a difference in scores after the training compared to before. Teachers were able to operate the application and began applying it in classroom activities. The program also helped teachers pay more attention to students’ cognitive aspects, including reading ability, attention, memory, and self-regulation. Overall, the implementation of this training provided practical benefits for teachers in supporting students with learning difficulties.

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