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# ENHANCING TEACHERS'S PEDAGOGICAL KNOWLEDGE THROUGH THE WORKSHOP OF SYSTEMATIC LITERATURE REVIEW

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## Abstract

This paper is aimed to describe the effectiveness of Community Service Program which was purposed to: (1) provide insights to teachers on the Systematic Literature Review research method, (2) equip teachers with skills to conduct research using the SLR method and compile their research articles, and (3) impart skills to teachers in web-based digital technology for reference searching. In line with these objectives, The Community Service presents Systematic Literature Review and the use of Mendeley as a tool for reference management. The target area for PkM is schools located in the Wukirsari Village, which is one of the villages in the Cangkringan District, Sleman Regency. The participants are 39 teachers from 13 schools, ranging from elementary to high school levels. This program is conducted in the form of workshops and mentoring. The results show that the pre test average score of participants is 40.513, while the average post-test score is 67.436. Through a comparison analysis of the pre-test and post-test, the average N Gain score is 0.434, indicating a "Moderate" category. This means that the workshop has successfully had an impact on increasing the knowledge and skills of the teachers.

**Keywords:** Systematic literature review, teacher professional development, teacher professional writing

## 1. Introduction

One of the elements of a teacher's performance in teaching is pedagogical knowledge. Nearly four decades ago, the idea was introduced that a teacher should possess seven knowledge bases, including pedagogical knowledge (pertaining to the teaching process), knowledge of the curriculum, and knowledge of students and their characteristics [1]. In Indonesia, the Teacher and Lecturer Law No. 14 of 2005 has emphasized that the first competency standard for teachers is pedagogical competence [2].

Pedagogical Knowledge is a general understanding of (1) teaching methods' characteristics, (2) student characteristics, and (3) educational context characteristics [1]. Regarding the first dimension, which is the characteristics of teaching methods, it is important for teachers to be able to manage student behavior in the classroom and facilitate effective learning in terms of the process, activities, and assessment. In the pedagogical knowledge dimension, the characteristics of students involve a teacher's knowledge related to how students learn, their physical and mental development, and their learning motivation. In the third dimension, which is the characteristics of the educational context, teachers need to have knowledge about educational philosophy, curriculum, and educational goals. The high demands on teachers to continually improve their pedagogical knowledge are due to the changing paradigms in education, advancements in science and technology, and educational policies. Knowledge is not static, including pedagogical knowledge. Lately, teachers in Indonesia are encouraged to implement differentiated learning [3,4]. This paradigm challenges the "one-size-fits-all" approach. However, there are still fundamental issues, namely that teachers encounter obstacles in lesson planning as well as content development [5].

One of the strategies to enhance pedagogical knowledge is through professional development, which is an activity aimed at building skills, knowledge, expertise, and other characteristics in a teacher [6]. Professional development can take the form of research and scientific writing. Scientific writing is a piece of work produced from a series of activities, including investigation, observation, data collection obtained from field research, laboratory work, or literature review with the aim of discussing or solving a problem. Various forms of scientific writing produced by teachers in relation to their professional development include scientific papers based on research findings [7]. The various types of scientific writing produced by teachers in connection with their professional development consist of scientific papers derived from research reports.

Research and its publication in the form of scientific writings contribute to the development of an educator [8]. Therefore, research and the publication of scientific writings are essential for sharpening the skills of teachers. Unfortunately, teachers still encounter obstacles when it comes to conducting research and publishing their research findings. This is also observed among teachers in Kelurahan Wukirsari, Kapanewon Cangkringan, Kabupaten Sleman. Based on discussions with the Coordinator of the Education Service Unit (UPT Pelayanan

Pendidikan) responsible for that region, the classic challenges faced by teachers include issues related to motivation, busy schedules, and teachers' capabilities. These findings align with research results regarding the difficulties teachers face in writing. The factors contributing to these challenges include psychological aspects like low motivation and self-confidence, workload that makes it hard for teachers to find time, as well as skills and technological factors such as difficulties in seeking references and the inability to optimize technology [9]. Another challenge arises from inadequate research facilities and the lack of mentoring or guidance for teachers conducting research. [10]. Given these conditions, teachers require alternative research methods that do not necessarily rely on primary data collection..

Teachers in the Village of Wukirsari have been primarily familiar with classroom action research and lesson study, which are based on primary data. They have not been exposed to research using secondary data. Therefore, this Community Service Program (PkM) aims to equip teachers with the skills to conduct research using secondary data, specifically Systematic Literature Review (SLR). This method was initially more prominent in the field of medicine for synthesizing research findings in a systematic, transparent, and reproducible manner. In SLR, there is the identification and critical assessment of relevant research, data collection, and analysis of studies related to the topic using explicit and systematic methods to review articles and all available evidence. The goal of a systematic review is to identify all empirical evidence that meets predetermined inclusion criteria to address specific research questions or hypotheses, while minimizing bias to provide reliable findings from which conclusions can be drawn and decisions can be made. SLR utilizes meta-analysis to analyze the combined results from various studies, allowing for the identification of patterns, discrepancies, or relationships that emerge across multiple studies on the same topic [11]. The core of the SLR method is to systematically review and identify journals, with each step following established protocols. Research articles using the SLR method are recognized and accepted by both national and international journals. SLR can help in setting research agendas [12]. Through SLR, teachers can review and critique existing educational practices while also following them up with classroom action research. Therefore, SLR can enhance pedagogical knowledge among teachers.

To conduct SLR, teachers need skills in reference search and the utilization of digital technology to facilitate citation. One of the tools that can be used is Mendeley. Reference manager technology is capable of automatically organizing references [13]. Based on the preliminary study, teachers in Kelurahan Wukirsari have not widely utilized web-based search and citation management features and applications like Mendeley for literature review and bibliography writing. However, the use of these applications has been proven to be very helpful in the convenience of writing scientific articles. On the other hand, the presence of artificial intelligence (AI) technologies such as Chat GPT, which is becoming known among academics, should be approached wisely by teachers. The role of Chat GPT can enhance the readability and language of research articles but not replace the primary tasks that authors must perform, such as data interpretation or drawing scientific conclusions [14].

Based on the given situation, several issues have been identified: (1) a lack of motivation among teachers to conduct research and produce scholarly works, (2) teachers' unfamiliarity with SLR as a research method, and (3) teachers' lack of skills in literature search and the use of reference management applications. Building on these conditions, this research is aimed to measure the effectiveness of the Community Service Program that provides teachers knowledge and skill in SLR.

## 2. Method

This research employs the classroom action research method with a one group pretest and posttest design. The number of participants involved is 39 teachers from 13 schools in the village of Wukirsari. Data analysis is conducted by comparing pre-test and post-test scores to produce the Gain normality test (N Gain test).

## 3. Results

This community service project is titled "Facilitating Research-Based Academic Publications through Digital Technology Optimization for Teachers in Kelurahan Wukirsari, Cangkringan District, Sleman Regency." The activities started with preparations in March 2023. The community service team coordinated with the village head of Wukirsari, the Coordinator of the Education Service Unit and the Head of SMK (vocational school) 1 Cangkringan School, Kapanewon Cangkringan. This community service program aims to develop the Wukirsari Village, and therefore, coordination with the village authorities and the Education Service Unit is essential. Coordination with the Head of SMK 1 Cangkringan is because the school has adequate facilities for conducting workshops. Scheduling for the workshops took relatively more time.

The second stage of the activity is the implementation of the community service in the form of workshops and mentoring for teachers. The targets for this workshop include:

1. Teachers understand the differences between the Systematic Literature Review method and other research methods.
2. Teachers understand the steps to perform the Systematic Literature Review method.
3. Teachers being able to create a background and problem formulation for scholarly articles based on systematic literature review.
4. Teachers being able to select relevant and suitable references from academic journals.
5. Teachers being able to compose analysis and conclusions in scholarly articles based on Systematic Literature Review.
6. Teachers being able to operate citation management.
7. Teachers being able to optimize search engines and AI applications for writing scholarly articles.
8. Teachers are able to create an outline for scholarly articles based on Systematic Literature Review.
9. Teachers being able to write scholarly articles based on Systematic Literature Review.

The workshop uses an andragogy approach and focuses on practical activities. The media used include online quizzes through quizziz.com, PowerPoint presentations, activity sheets, sample Systematic Literature Review research articles, Mendeley and Google Form applications. During the workshop, participants use their own laptops connected to the internet. After the workshop, mentoring is provided through a WhatsApp group, divided into five groups and takes place from June to September 2023. Each group is facilitated by a lecturer. The third stage is the evaluation. The PkM team provides a survey link to participants to rate their assessment of the workshop. This stage is also carried out to monitor the extent to which the expected outcomes of this PkM are achieved. The expected outcome is the creation of collaborative articles between teachers and the PkM team.

A total of 39 participants attended the workshop out of the targeted 40. The schools of the participants are 9 primary schools, 2 middle schools, 1 high school and 1 high vocational school. Throughout the training, the teachers demonstrated interest because the material was new to most of them. Here is an overview of the PkM implementation.

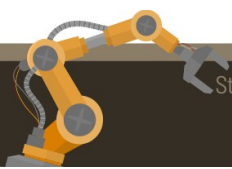
Table 1. The Sequence of Activities in Workshop

Day	Method	Media
1	Pre-test	Quizzes
	Presentation on SLR	PPT slides
	Teachers observe examples of research articles based on Systematic Literature Review	Sample article, worksheet
	Teachers identify the steps in conducting Systematic Literature Review research and report it on the Activity Sheet	Sample article, worksheet
	Presentation on how to create the introduction for SLR	Sample article, worksheet
	Presentation on how to select relevant and appropriate references from academic journals	Worksheet, journal website
2	Teachers practice direct reference searching using databases such as Arjuna, Google Scholar, and Elsevier	website
	Presentation on Mendeley	Mendeley
	Tutorial and practice on using citation management	Mendeley
	Composing an outline of the SLR research draft	Worksheet
	Post test	Quizzes
	Coaching and consultation	Email, WhatsApp

To measure the success of the training method, data analysis is conducted on the results of the pre-test and post-test. The method used for data analysis is through pre-experimental research with a one-group pretest and posttest design. Data is analyzed by performing the Gain normality test to calculate the training's impact on the participants using the formula [15]:

$$N \text{ Gain Score} = \frac{Skor \text{ posttest} - Skor \text{ Pretest}}{Skor \text{ Ideal} - Skor \text{ Pretest}} \quad \frac{Skor \text{ posttest} - Skor \text{ Pretest}}{Skor \text{ Ideal} - Skor \text{ Pretest}}$$

The calculation of N Gain values for all workshop participants is presented in the attached table.



Referring to the attached table, the average pretest score is 40.513, while the average post-test score is 67.436. The highest individual N Gain Score obtained is 0.8, and the lowest is 0. Here are the criteria for N Gain values for participants using the N Gain value categorization table.

Table 2. The Categorization of N Gain Score

N Gain Score	Category	N
$G > 0,7$	High	5
$0,3 \leq G \leq 0,7$	Moderate	21
$G < 0,3$	Low	13
N		39

On average, the N Gain Score reaches 0.434, which falls into the "moderate" category. However, based on the average percentage of N Gain Score, which is 43.417%, it can be interpreted that the workshop method is "less effective." This aligns with the interpretation provided in Table 3.

Table 3. Interpretation of Effectiveness Based on N Gain Percentage (%)

Persentase	Tafsiran
<40	Ineffective
40-55	Less effective
56-75	Effective
>76	Very Effective

In terms of training outcomes, out of the 39 teachers, 5 have followed up on the training by creating draft articles, and 1 person has reached the stage of submitting an article.

#### 4. Discussion

In terms of the comparison between the pre-test and post-test, the results indicate that the N Gain falls into the "less effective" category. In response to this, there are a few aspects that need to be reviewed. One technical obstacle is that some participants had laptops that were not compatible with the requirements of the Mendeley application. As a result, participants' speed in receiving and following the material varied. Additionally, age factors also influenced the agility of participants in navigating the application..

Effective professional development for teachers is characterized, in part, by the presence of mentoring and expert support to meet individual teachers' needs and promote theory-based and evidence-based sharing [16]. Efforts have been made by the lecturers during the workshop. However, the arrangement of classic tables and chairs limits the flexibility of the presenters. This is because the room's furniture layout is not easily rearranged due to its weight. Additionally, the room's space is relatively limited.

Another issue is the adequacy of training time, especially in the part related to journal searching and citation management. This occurs because there was feedback from all participants' school principals regarding the desired brief, concise, and compact workshop schedule. Furthermore, at the same time, the teachers also faced academic and administrative work commitments at their schools, so the community service team had to compromise with this situation. The limited duration of the workshop left the teachers with insufficient time to operate citation management digital applications directly. The theory of teacher professional development suggests that teachers should be encouraged to collaborate and engage in mentoring [17]. In this case, the trainer suggested that participants continue practicing at home and collaborate with colleagues from their own or other schools to produce scholarly articles.

Based on the findings, the difficulty teachers face in completing their assignments after the workshop reflects the level of motivation for professional development that needs to be optimized. This workshop results implies that the learning process for teacher professional development should encourage teachers to improve their self-regulated learning. Self-regulated learners are active participants in their learning process. This included their

attempt to monitor and regulate their cognition, motivation, and behavior in regard to achieve their learning goal [18].

Another thing that should be taken into account is the factors that influence teacher's motivation are personal expectations, need satisfaction, and work climate [19]. As teachers shared in the workshop, workload triggers difficulties for teachers in balancing their time between teaching and professional development. This may be related to a relatively non-conducive work environment. Another influential factor is the age of the teachers. Using a reference manager requires teachers to be able to operate applications on a computer. Previous research has revealed a strong influence of age on teachers' interest in using information and communication technology [20].

## 5. Conclusion

Teachers have shown interest in the Systematic Literature Review (SLR) research method as an alternative form of research and scholarly publication. The two-day training has resulted in an increase in participants' knowledge and skills, as evidenced by the average N Gain Score of 0.434. Individually, 5 participants achieved high N Gain scores, 21 participants were in the moderate category, and 13 participants were in the low category. So, 69% of participants have achieved a good N Gain score. However, based on the interpretation of the N Gain percentage, the workshop still needs to improve its effectiveness.

The implications of this research suggest the need to encourage teachers to read scholarly journals to keep their knowledge about learning innovations up to date. Schools can also collaborate with higher education institutions to co-write articles in scholarly journals. Additionally, training activities for scholarly publications using digital advancements should be held regularly and continuously to produce articles published in scholarly journals. To be more effective, training and mentoring should be conducted in small groups, scheduled, and accompanied by rewards or compensation if teachers are able to produce articles.

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