

Sustainable Professional Development: Skills and Needs for Scientific Publication Training for Elementary School Teachers

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ARTICLE INFO

Article history:

Received June 16, 2021

Revised June 18, 2021

Accepted November 29, 2021

Available online March 25, 2022

Kata Kunci:

Pembangunan Berkelanjutan, Profesionalisme Guru, Publikasi Ilmiah

Keywords:

Sustainable Development, Teacher Professionalism, Scientific Publications



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ABSTRAK

Guru kurang memiliki pengetahuan dan keterampilan dalam publikasi ilmiah. Publikasi ilmiah merupakan upaya untuk meningkatkan penguasaan ilmu pengetahuan dan keterampilan dalam melaksanakan pembelajaran sepanjang hayat bagi guru. Penelitian ini bertujuan untuk mengumpulkan informasi, menganalisis, dan mendeskripsikan kemampuan, kebutuhan pelatihan guru sekolah dasar dalam publikasi ilmiah termasuk faktor penghambat dan solusi yang diperlukan. Penelitian dilakukan dengan menggunakan metode penelitian campuran dengan desain explanatory dengan melibatkan 87 guru sekolah dasar. Pengumpulan data dilakukan melalui teknik survei, wawancara, dokumentasi, dan observasi. Analisis data dilakukan dengan teknik deskriptif kuantitatif, kualitatif dan triangulasi. Hasil penelitian menunjukkan bahwa meskipun sosialisasi dan pelatihan pengembangan profesional berkelanjutan diterima oleh guru, faktanya pengetahuan dan keterampilan guru dalam publikasi ilmiah masih sangat rendah. Beberapa faktor penghambat guru dalam publikasi ilmiah antara lain kurangnya penguasaan teknik penulisan ilmiah, kurangnya keterampilan IT, Lemahnya keterampilan menulis ilmiah, rendahnya literasi guru, kurangnya referensi yang tersedia, motivasi, waktu, layanan penulisan ilmiah yang meluas, dan kurangnya pelatihan. Alternatif solusi yang dapat direkomendasikan antara lain perbaikan sistem pendidikan tinggi, khususnya Lembaga Pendidikan Tenaga Kependidikan, dan pendidikan dan pelatihan berbasis kebutuhan guru dalam publikasi ilmiah.

ABSTRACT

Teachers lack knowledge and skills in scientific publications. Scientific publication is an effort to improve the mastery of science and skills in carrying out lifelong learning for teachers. This study aims to collect information, analyze, and describe elementary school teachers' ability and training needs in scientific publications, including the inhibiting factors and the required solutions. The research was conducted using mixed methods with an explanatory design involving 87 elementary school teachers. Data was collected through survey techniques, interviews, documentation, and observation. Data analysis was carried out using quantitative, qualitative, and triangulation descriptive techniques. The results showed that although teachers received the socialization and continuous professional development training, the knowledge and skills of teachers in scientific publications were still very low. Some of the inhibiting factors for teachers in scientific publications include lack of mastery of scientific writing techniques, lack of IT skills, Weak scientific writing skills, low teacher literacy, lack of available references, motivation, time, widespread scientific writing services, and lack of training. Alternative solutions that can be recommended include improving the higher education system, notably the Educational Personnel Education Institute, and education and training based on the needs of teachers in scientific publications.

1. INTRODUCTION

The quality and professionalism of teachers is still one of the government's focuses in improving the quality of education in Indonesia. So far, the government has tried to improve the quality of teachers, both in public schools and private schools with the issuance of Law number 14 of 2005 concerning Teachers and Lecturers which explicitly facilitates teachers to be able to develop their competencies (Harjanto et al., 2018; Novita et al., 2020). In the context of Indonesian education, as mandated by the law on teachers and

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lecturers, professional teachers are required to master four competencies including pedagogic competence, social competence, professional competence and personality competence (Arqam, 2019; Hartanti & Yuniarsih, 2018; Wahyono et al., 2020). Various programs were launched in the context of professionalizing more than 2.8 million Indonesian teachers (Mahdum et al., 2019). The government is also revamping the teacher education curriculum in universities by expanding the teacher education program into a one-year Teacher Education Program (PPG) in addition to the four-year undergraduate program.

Although the government has made various efforts to improve teacher professionalism, the challenge of realizing professional teachers in Indonesia cannot be said to be easy, let alone just finished (Lubis, 2018; Sulisworo et al., 2016). This ineligibility is partly because the level of teacher education does not meet the requirements and does not yet have an educator certificate (Kholis, 2019). A study revealed that only 60% of teachers were qualified to teach due to a lack of competency development and skills training (Kuntarto et al., 2019). Even in the midst of distance learning conditions that are currently being instructed, it turns out that only 30% of teachers are eligible to teach with online learning (Abidah et al., 2020).

Preliminary studies on elementary schools in Purwakarta district, show the problem that teachers have less knowledge and skills in scientific publications. They are more preoccupied with the administrative affairs of the 2013 curriculum learning which takes their mind, energy and time. In fact, their time is more focused on worksheets than on pedagogy and the quality of learning. On the other hand, the teachers admit that the development activities so far have not been optimal in improving their continuing professional competence and skills. Previous research showed that professional teacher development programs and other forms of training have been carried out, but have not been considered effective in improving teacher quality (Harjanto et al., 2018).

The development of teacher professionalism needs serious attention, because effective teachers will produce quality education (Daryanto & Tasrial, 2015; Freeman, 2019; Rahayu & Wirza, 2020; Utami & Hasanah, 2019). The government needs to make criteria for minimum quality standards accompanied by quality instructions on how teachers carry out sustainable development in order to improve their professionalism (Lestyanawati & Widyantoro, 2020; Taufik, 2020). This in turn requires teachers to be qualified to perform work effectively (Melesse & Gulie, 2019). Furthermore, in order to follow up the development of teacher professionalism in Indonesia, the government through the Regulation of the Minister of State for Administrative Reform and Bureaucratic Reform Number 16 of 2009 concerning Teacher Functional Positions and Credit Scores requires three components of continuous professional development for teachers, namely development self, scientific publications and innovative works (Rusdarti et al., 2019). Teacher professional development aims to improve the professionalism, quality, and accountability of teachers and education personnel (Rahyasih et al., 2020).

The research report that sustainable professional development for elementary school teachers, scientific publication activities have not been carried out effectively (Dewi, 2018; Wijiutami et al., 2020). Meanwhile, other research found that continuous professional development in making scientific publications for teachers through workshops and mentoring has increased teacher knowledge in increasing professional competence in making scientific publications (Isdaryanti et al., 2018). This contradiction with teacher professional development indicates that teachers feel preoccupied by changes in the Ministry of National Education's policy to cover and transfer the prescribed curriculum and subject content (Irmawati et al., 2017). In addition, according to other research that most teachers around the world feel that professional development activities are too short, unrelated to teacher needs and ineffective for improving teaching knowledge and skills (Bautista & Oretga-Ruiz, 2017). In practice, the professional development of teachers still finds obstacles and challenges including time management, costs, bureaucratic systems, and teacher internal factors such as personality, motivation, and commitment (Tanang & Abu, 2014). The implications of this fact, the writing and publication of scientific papers among teachers is still a concern. This is indicated by the low productivity of teachers in writing and publishing scientific papers. The head of the Ministry of National Education Book Center reports that less than 1% of teachers can write (Asmawati & Bintang Kejora, 2020).

The implementation of the teacher's continuous professional development program is expected to improve the basic competencies of teachers and support the Learning Teacher Professional Development (Dahlan et al., 2020; Harjanto et al., 2018; Jin et al., 2022). Therefore, based on preliminary studies and literature studies that have been carried out, this study aims to analyze the abilities and needs of teacher professional development programs through scientific publications. This research is expected to be a source of information in making decisions regarding appropriate approaches and methods in meeting the needs of increasing scientific publication competence for elementary school teachers (Suhartini et al., 2021).

2. METHOD

This study is a mixed study with explanatory methods (Saunders et al., 2016). This study collects, analyzes, and combines quantitative and qualitative data to analyze and evaluate the professional development needs of teachers through scientific publications (Sugiyono, 2016). The study involved 87 elementary school teachers in the Singawinata Cluster 1, Purwakarta district. Data were collected through surveys, interviews, and observations. The survey was first completed and then interviews and observations were used as a follow-up to enlighten the quantitative results. Quantitative data provide extensive information on the continuing professional development needs of teachers. On the other hand, qualitative data provide a rich description of the continuous professional development of teachers with a smaller sample quantity. Therefore, this study produces findings that represent the need for an enhanced program with details from qualitative data.

A Likert scale questionnaire (1-5) was used to collect data on the ability of teachers in scientific publications, including programs that have been implemented, the work produced, and the impact of training activities for teachers. The Likert scale used includes; very good with a score of 5; good with a score of 4; enough with a score of 3; low with a score of 2; and very low with a score (Sugiyono, 2016). After quantitative data is collected, the next step is to analyze and determine the average score of each item. Data in the form of scores or numbers are identified using the Bringula interval with a 5-point scoring scale showed in Table 1.

Table 1. Verbal Interpretation

No	Value Range/Score	%	Criteria
1.	1.00 – 1.80	20% - 36%	Very low
2.	1.81 – 2.60	37% - 52%	Low
3.	2.61 – 3.40	53% - 68%	Enough
4.	3.41 – 4.20	69% - 84%	Good
5.	4.21 – 5.00	83% -100%	Very good

Qualitative data were analyzed using descriptive and triangulation techniques to obtain accurate and accountable data by matching the data obtained through surveys, interviews, documentation and observations that were monitored and guided by the research team (Moleong, 2018).

3. RESULT AND DISCUSSION

Result

At the data collection stage, a survey was conducted using a questionnaire. The survey was attended by 87 teachers including 15 teachers aged 30 years, 23 teachers aged 31-40 years, 31 teachers aged 41-50 years, and teachers aged 51-60 years as many as 18 people. The questionnaire was distributed containing several questions and the teacher simply answered by giving a checklist on one of the two answer options, namely "yes" or "no". The data is then classified by age level to determine the extent of teacher knowledge regarding teacher continuous professional development programs through scientific publications. The results of the survey are reported in Table 2.

Table 2. Teacher's Response Regarding Continuous Professional Development

No	Information	Age				Average	Interpretation
		30 %	31 - 40 %	41 - 50 %	51 - 60 %		
1.	Do you understand about continuous professional development?	80.00	82.61	83.87	55.56	75.51	Good
2.	Are there any socialization efforts regarding sustainable professional development to teachers?	100.00	100.00	93.55	83.33	94.22	Very good

No	Information	Age				Average	Interpretation
		30 %	31 - 40 %	41 - 50 %	51 - 60 %		
3.	Did you know that scientific publications are an important component in the continuing professional development of teachers?	53.33	43.48	58.06	11.11	41.50	Less
4.	Have you ever attended scientific publication training for continuous professional development?	13.33	21.74	22.58	0.00	14.41	Very less
5.	Has the training you attended had a significant impact on your ability in scientific publications?	20.00	8.70	6.45	0.00	8.79	Very less
6.	Has your work been published in a continuing professional development program?	13.33	8.70	3.23	0.00	6.31	Very less

The next data collection is about the results of scientific publications carried out by teachers. This data describes the scientific work of teachers and the percentage of teachers who have carried out scientific publication activities in the last 5 years (2015-2020). The survey results are reported in [Figure 1](#).

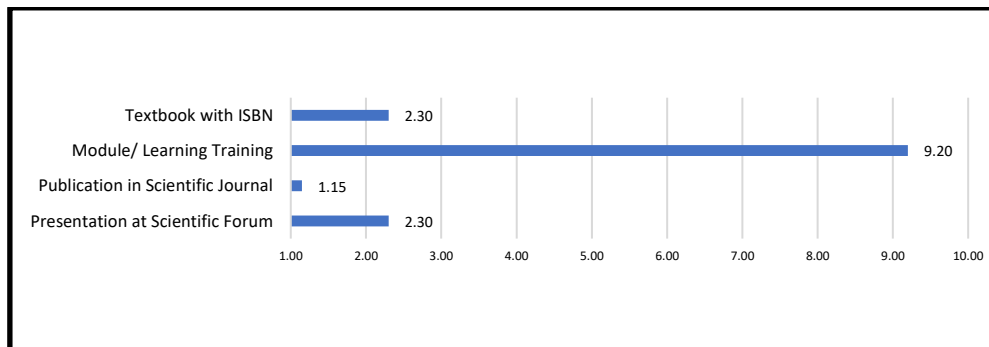


Figure 1. Teacher's Scientific Publication Results

The next stage is collecting data in the form of teacher self-evaluation related to teacher skills in carrying out scientific publications. Collecting data using a Likert scale questionnaire (1-5) to 87 teachers. As a result, the scientific publication skills of teachers when averaged quantitatively is 1.49 and shows the very low ability of teachers to conduct scientific publications. Teacher Skills in Scientific Publications is presented in [Figure 2](#).

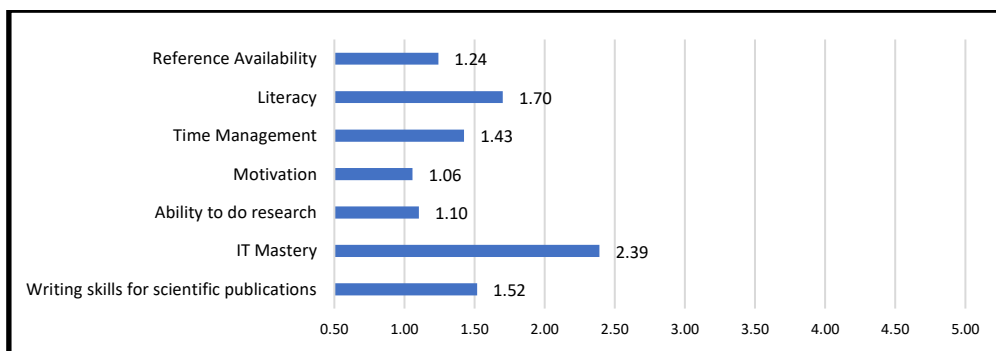


Figure 2. Teacher Skills in Scientific Publications

The next survey conducted in data collection was regarding the need for scientific publication training for teachers. This speaks of the need for scientific training for teachers. The teacher fills out a questionnaire containing the question "Do you feel the need for training to improve the ability of teachers in scientific publications? ". They simply answer two answer options, namely "yes" or "no". The data are classified according to the age of the teachers and their answers regarding the need for training for their professional development. The data shows that 98.11% of teachers in the Gugus 1 Singawinata Teacher Working Group in Purwakarta stated that they needed scientific publication training. The results of the Scientific Publication Training Needs Survey are presented in Figure 3.

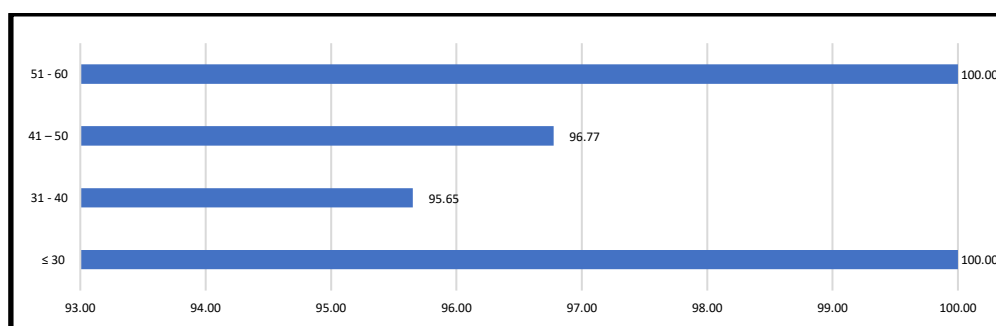


Figure 3. Results of the Scientific Publication Training Needs Survey

In this section, we try to discuss the ability of teachers, existing and ideal conditions, gaps and continuing professional needs in scientific publications for elementary school teachers in the Singawinata Gugus Teacher Working Group, Purwakarta Regency. The Analysis of the Needs for Continuous Professional Development of Teachers Through Scientific Publications in KKG Cluster 1 Singawinata is presented in Table 3.

Table 3. Analysis of the Needs for Continuous Professional Development of Teachers Through Scientific Publications at KKG Cluster 1 Singawinata

Existing Condition	Ideal conditions	Gap	Needs
The demands of the development of science, technology and the industrial revolution have a disruptive effect on the rapid development of the world of education which also demands an increase in the quality of education and learning by teachers.	Teachers are able to adapt to the demands of the development of science, technology and the industrial revolution by increasing competence and professionalism. So as to improve the quality of teaching and education.	Teachers' scientific publications are still very low in the 4 components of presentations in scientific forums (2.3%), publication of research results in journals (1.15%), compiling learning modules/dictations (9.2%), and textbooks	Scientific publication training for teachers directed at research abilities Classroom action. It also includes training to improve writing skills for scientific publications, IT mastery, motivational improvement, management and time. It is also
The government has programmed to increase the competence and	With the Continuing Professional Development Program as a condition for increasing credit scores for		

Existing Condition	Ideal conditions	Gap	Needs
<p>professionalism of teachers by holding the Continuing Professional Development Program (PKB) for teachers, including through scientific publications. This is regulated in the Regulation of the Minister of State for Empowerment of State Apparatus and Bureaucratic Reform Number 16 of 2009 concerning Teacher Functional Positions and Credit Scores.</p> <p>The condition of scientific publications among teachers in 4 categories, namely presentations in scientific forums (2.3%), publication of research results in journals (1.15%), compiling learning modules/dictations (9.2%), and ISBN textbooks (2.3%)</p>	<p>teachers, teachers should also carry out quality and sustainable scientific publications based on research results and non-research results.</p> <p>Teachers must have professional skills in scientific writing skills, attend presentations in scientific forums, conduct class-based research, publish scientific papers and be actively involved in compiling learning books, both module and ISBN.</p> <p>Teachers are also required to reflect on learning and become a problem solver in learning activities in the classroom.</p>	<p>containing ISBN (2.3%). The average scientific publication is (3.73%), meaning that only an average of 3 teachers out of 87 are actively conducting scientific publications.</p>	<p>necessary to improve literacy for teachers who are supported by the availability of references</p>

In the last 5 years (2015-2020), of the 87 teachers in the KKG Cluster 1 Singawinata, Purwakarta Regency, the data shows 2.3% or as many as 2 teachers compiling ISBN textbooks; 9.2% or as many as 8 teachers are involved in the preparation of learning modules for students; 1.15% or 1 teacher publishes in scientific journals; and 2.3% or as many as 2 teachers participated in presentations in scientific forums. Thus, only about 3.73% of the 87 teachers carry out scientific publications in the continuing professional development program. This illustrates the very low quality of the ability of teachers in scientific publications. Teacher skills in scientific publications are measured based on seven indicators including scientific writing skills, IT mastery, ability to conduct research, motivation, time management, literacy, and availability of references. The results reveal a very low level of skills that teachers have in scientific publications. This problem needs to be taken seriously. In fact, 98.11% of teachers stated the need for training to increase teacher competence in scientific publications.

Discussion

Abilities and Needs for Professional Development of Teachers Through Scientific Publications

The transition from teacher to teacher as educator and researcher is considered a key element in the development of the teaching profession (Juusola & Rähkä, 2018; Lunenberg et al., 2014; Radović et al., 2021). This transformation requires teachers to be able to play a role as researchers and conduct scientific publications for the research they do (Kuntarto et al., 2019; Malihah, 2015; Nurjanah & Sofiwati, 2019). If teachers are expected to conduct research, what should be the focus: the school curriculum, the teaching and learning process, or their own practice of narrative inquiry? this problem is accompanied by debates about objectives, methods and quality criteria, especially regarding teachers' research on themselves (Lunenberg et al., 2014; Tack & Vanderlinde, 2014; Wilder-Smith & Freedman, 2020).

The results of the study show that teachers have good knowledge and understanding of sustainable professional development programs. This is due to very good socialization efforts from related parties such as the education office, supervisors, school principals, and the activity forum of the elementary school teacher working group. Although the socialization and knowledge about the existence of the development teacher program have been received by the teacher. The problem that occurs is the teacher's low knowledge that scientific publications are an important component for teacher development. This illustrates that teachers also have low competence and ability in compiling and implementing scientific publications. The low ability of teachers is also influenced by the lack of training programs for teachers, the impact is the lack

of teacher interest, motivation, and ability to carry out scientific publications as required in the sustainable professional development program. The research found that the active participation of teachers in professional development activities significantly showed a positive impact on teacher beliefs and practices, student performance in learning and education reform in general (Hasan Tanang & Abu, 2014). Other research explain that teachers are one of the characteristics of the educational profession that require continuous training to develop their professionalism (Rahyasih et al., 2020; Srinivasacharlu, 2019). The UNESCO shows a strong relationship between teacher professional development and education quality, especially in the areas of teacher beliefs and practices, student learning and the implementation of education reforms (Melesse & Gulie, 2019).

In this regard, given the important role of teachers in the implementation of education reform, other research recommends the need for future research to further explore the conditions under which an effective teacher continuous development process can occur (Maciejowska et al., 2020; Ucan, 2016). Kind of support is very necessary and allows the birth of potential contributions to create the best CPD experience that teachers can develop themselves continuously and become creative, innovative, and wise professionals who can have a positive impact on the quality of the teaching and learning process (Jovanova-Mitkovska, 2010).

Inhibiting Factors For Teachers in Scientific Publication

Research is actually not a new thing in the learning process, because the development of learning is always preceded by research. The learning process that takes place today is the result of research that has been done in the past. In Indonesia, the trend is that teachers do not conduct research to improve the quality of learning, find ideas for new learning methods, and even evaluation tools. Teachers just wait for the results of research from universities, then try to apply if they are considered easy to do and otherwise forget if they are considered difficult for themselves. Even teachers seem to avoid getting involved in scientific research and publications. In this study, we try to analyze several factors that affect the ability of teachers to develop scientific publications.

First, Writing Technique. Lack of knowledge, understanding, and skills of teachers in writing scientific papers. Most of the teachers admitted that the lack of clarity in writing techniques made many teachers reluctant to start or write papers (Dewi, 2018; Nayak, 2016; Wijiutami et al., 2020). They do not know the writing technique for classroom action research. For teachers aged 20-30 years, they generally experience classroom action research courses while in college, but for teachers aged 40-60 years, they find it difficult to understand methods and techniques because of the lack of training and socialization.

Second, Lack of IT skills. Currently the need for scientific publications is greatly helped by technological advances. Various applications, platforms, and online journals can help teachers develop their skills (Patacsil & Tablatin, 2017). However, for teachers who lack skills in utilizing the development of computer and internet technology, of course, they will experience many obstacles in making scientific work (Danniels et al., 2020; Gavaldon & McGarr, 2019). Even basic skills such as applying Windows, Microsoft Word, and Excel programs must be mastered as the basis for literacy and numeracy in IT skills.

Third, Available writing, literacy and reference skills. Writing requires a special skill. Writing scientific papers is different from writing prose, poetry, rhymes, novels, newspaper articles or short stories (Hartati & Rasyid, 2017). Writing scientific papers has objectives, methods, analytical techniques and drawing conclusions that refer to scientific procedures. So far, teachers are not required to conduct research and publications so that they are not trained to compose and write scientific papers (Hartati & Rasyid, 2017; Sholah, 2019). Writing skills are closely related to teacher literacy activities. The better the literacy level, the positive impact on writing skills. Writing really requires broad insight so that written works are rich in knowledge and are up to date, so they are important to be published. This is also supported by reference facilities available in school libraries or regional libraries.

Fourth, Motivation. Motivation is an important stimulus that directs human behavior (Tan & Rajah, 2019). No individual has the same attitude or behavior and motivation is the main factor that can move a person's heart to be able to do a job and achieve certain goals. Likewise with teachers, they carry out their duties and functions as professional educators of course driven by motivation to achieve the expected goals (C. Anwar et al., 2018; Chai et al., 2017). This study shows that most of the teachers feel lazy to write. Their motivation is very low and only 26.44% of teachers have the motivation to develop themselves in scientific publications. Not just writing motivation, most teachers have less motivation in participating in the training. They follow the training only to fulfill the instructions from their official or agency head. Even though it is clear that they have been required to carry out writing activities and scientific publications since 2009 as stated in the Regulation of the State Minister for Administrative Reform and Bureaucratic Reform No. 16 of 2009.

Fifth, Time. The limited time to write is often cited as the main obstacle in writing scientific papers. Currently with the presence of various demands for educational innovation and curriculum changes, it is not uncommon for teachers to feel more preoccupied with learning administration matters than the teaching activity itself (Asrial et al., 2019; Sahito & Vaisanen, 2017). In Purwakarta district, elementary schools start activities at 6 AM, and will end at 14 PM. Generally, teachers are women where they also after finishing teaching activities, then go home busy with household matters. Teachers feel tired, not to mention other administrative tasks that must be completed and preparation for teaching for the next day.

Sixth, The rise of scientific work creation services. The demands of scientific publications that are not matched by the skills of teachers encourage ideas to find alternative ways to meet the demands (Nayak, 2016; Omer, 2015). They choose to use the services of making scientific papers which are considered a solution for them. Even 70% of teachers admitted to using this service to encourage their promotion.

Seventh, Lack of Training. So far, the government has been quite intense in conducting training for teachers (Hatip et al., 2019; Hidayat et al., 2020; Saryantono & Nurdiana, 2018). However, based on the survey, teacher responses show that training for scientific publications for teachers is still very lacking. The training activities carried out were still discussing matters directly related to learning such as discussing the 2013 curriculum and its changes, syllabus, lesson plans, teaching materials, and assessments. Meanwhile, those related to sustainable professional development have received less attention. Although there are some teachers who have attended scientific publication training, they consider that the training is too short, limited to socialization, just talking about concepts, have not touched the order of research practice, and have not been effective in improving the skills of teachers to write scientific papers (Leonard, 2016; Mafulah & Purnawati, 2020). A more planned, systematic and effective training is needed so that teachers are continuously able to conduct scientific publications. And this is not limited to conducting training, but also continuous evaluation and assistance until the teacher actually produces scientific work.

Solutions for Teacher Needs in Scientific Publications

Scientific publications are very important for the professional development of teachers. The inability of teachers to carry out scientific publications will have an impact on the development of teacher careers in the future. This condition needs to be addressed, including, First, Improvement of the higher education learning system. The results of the teacher competency test in 2015 showed the low competence of teachers placing universities as the most responsible institutions with low competence (Bhakti & Maryani, 2017; Dahlan et al., 2020). Universities should conduct an analysis of their curriculum, whether it is still in accordance with the conditions in the field or already needs to be evaluated. Universities also need to conduct an analysis of graduate users, especially schools, especially what basic competencies graduates should have (Nurramadhani, 2019; Sulisworo, 2016). The strategies that have been carried out in improving the quality of the LPTKs are 1) improving the LPTK curriculum based on the KKN and SNPT, 2) strengthening research-based learning systems, 3) developing scientific literacy-based learning models, 4) strengthening educational internship programs, 5) strengthening eyesight. lectures on research methods and scientific writings and 6) Quality development of LPTKs (Coman et al., 2020).

Second, Education and Training according to the needs of teachers. Training for teachers is a solution for developing teacher competence and professionalism (Anwar et al., 2020; D'Elia, 2019; Sadimin Sadimin et al., 2017). For this reason, several things that can be done to increase teacher competence are designing a training model for teachers to improve writing skills and scientific publications accompanied by ongoing mentoring and evaluation. We find that scientific publications by primary school teachers are still very low. With these findings, also found a similar thing where it seemed as if the basis carried out by almost all teachers said that the implementation of scientific publications was still carried out optimally (Wijiutami et al., 2020). This can be seen from the absence of document data produced by the teacher. Teachers cannot show the results of scientific publications in the form of research, scientific reporting, teacher manuals, or publication of textbooks.

The continuous professional development efforts of teachers cannot be separated from the role of the principal as the leader of educational institutions (Kartini et al., 2020; Kuswana, 2019; Lukman et al., 2020). The principal's intervention through instructional will make teachers more motivated to do self-development (Cunningham et al., 2022; Hamzah et al., 2021). Other research recommending and emphasizing the need for a good leadership role in the continuous professional development of teachers (Gaikhorst et al., 2017). The principal can assign teachers to participate in professional development activities, hold on-the-job training, or assign teachers to write published scientific papers. Previous research found that in schools that are successful in professional development programs, teachers feel that their expertise is recognized and used by their principals in developing the quality of school organizations (Snoek et al., 2017).

Sustainable professional development through scientific publications is a necessity for elementary school teachers to actively develop competencies, skills, and professionalism. Teacher development not only meets the needs of teacher credit scores but also improves the quality of learning and the quality of education. With the policy of regional autonomy and school-based management, education policy makers should support teacher development by providing training that can facilitate the needs of teachers to increase scientific publications. The results of this study can be used as a reference for education policy makers, school principals and teacher professional organizations to determine appropriate training strategies in carrying out sustainable teacher professional development in accordance with existing and necessary needs analysis. So far, teacher professional development is more focused on teaching and pedagogical competence and teacher administration development. Even though today we want teachers not only to be able to provide good quality learning. Moreover, they also have to conduct research and publish scientific papers as part of their professionalism as 21st century educators.

4. CONCLUSION

Sustainable professional development is a long-term and continuous process of professional and personal growth of teachers. The low ability of teachers in scientific publications needs to be improved through teacher training based on knowledge, skills, new strategies in their respective fields of competence and the application of appropriate technology. Continuing professional development is important because it has a significant influence on teachers' beliefs and teaching practices.

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