

Investigating the Elements of Teachers' Professional Learning Network: Experiences in Indonesia

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Abstract

Professional learning networks that utilize various social media platforms have sprung up among teachers, including in Indonesia. Social media-based professional learning networks are an alternative way of formally dealing with multiple limitations of teacher professional development in Indonesia. The research investigates 504 teachers' experience in social media-based professional learning networks and their reasons for engaging. This study uses a mixed method with a sequential explanatory approach. Data was collected using questionnaires and in-depth interviews, and then the data was analyzed quantitatively and qualitatively. The results show that the teachers' level of experience engaged in social media-based professional learning networks has yet to demonstrate the maximum level of each element of professional learning network experiences. Teachers' reasons to be engaged in social media-based professional learning networks are to facilitate the learning process of teachers according to their needs, place them in equal roles and positions, provide opportunities for sharing and collaboration, emphasize learning strategies from fellow teachers, inspire good practices that have an impact on students, and encourage them always to reflect. Harmonizing the reasons with the learning experiences developed in social media-based professional learning networks can be an alternative way to increase professional learning network experiences for teachers.

Keywords: Learning Networks, Professional Experiences, Social Media, Teacher Development.

Introduction

Previous studies have shown the importance of Teacher Professional Development (TPD) in the education system, especially in realizing high-quality education and learning (1–3). Ideally, there are systems, models, methods, and strategies that effectively assist teacher development. That includes the support of various parties to realize teacher professional learning and development in increasing competence, providing sufficient space and time for collaboration, reflection, feedback cycles, and building networking as an effort for them to maintain and improve the quality of their learning (4). In the context of the TPD, which is formally implemented in Indonesia, various problems remain an obstacle to the effective implementation of the TPD, namely the limitations of the TPD program due to regional coverage, the number of teachers, and the disproportionate budget as an organization, the independence, relevance and support, the formal community scheme has not been maximized (5, 6); TPD tends to be top-down and not maximal due to low

program relevance, incidental and unsustainable activities (7, 8), TPD has not been internalized by teachers so that the independence and significance of program outputs, including the outcomes of the teacher certification program are low (9, 10). This problem is serious for the Indonesian government. Previous studies have shown that a lack of support for teachers, low national standards for the teaching profession, and a lack of sustainable professional development contribute to lower-quality learning outcomes. Conversely, good teacher professional development will encourage the improvement of the quality of teaching, achieving learning objectives, progressing the learning process and student learning outcomes, increasing school effectiveness, and encouraging educational reform (1, 11, 12).

Some teachers have taken the initiative and are moving in line with the emergence of various TPD problems in Indonesia. They build networks and informal communities through social media and develop teacher community activities focusing on

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learning activities to build professionals, reflect, and collaborate to explore needs, problems and solutions. The combination of smartphone technology devices, internet networks, and various social media applications that are increasingly accessible to teachers has become the driving force behind the emergence of community networks that have been initiated and consisting of teachers. Their activities focus on learning together to improve their competence and professionalism, in various literature known as Professional Learning Networks (PLN). Their actions and experiences in PLN are built and manifested in multiple interactions and events in the network, which are sometimes followed by face-to-face events. They use social media networks such as Twitter, Facebook, Telegram, Instagram, WhatsApp and YouTube.

Teachers' use of various social media platforms to support their activities and experiences in PLN has been widely investigated and explored through multiple previous studies. These studies, among others, discuss PLN from the point of view of the form of utilization, activities, and results obtained by teachers (13–15). Also included are studies on social media-based PLN activities among pre-service and early teachers (16, 17). Studies have also been conducted in various country settings (18–21). Including several studies on social media-based professional learning conducted in the Indonesian context (22–24). Meanwhile, studies on PLN that utilize social media from the side of the elements of PLN experiences among teachers have not been widely investigated by previous researchers, including in Indonesia.

It is essential to study the elements of PLN experiences to understand the activity units carried out by teachers in social media-based PLN in their communities. The concept of the elements of PLN experiences from Krutka *et al.* can be used as a reference in exploring the experiences of teachers in social media-based PLN; they emphasized that "We offer a model for teacher educators and teachers to consider key elements of PLN experiences: engaging, discovering, experimenting, reflecting, and sharing" (25).

For this reason, a specific research topic investigating the elements of PLN experiences among teachers in Indonesia and carried out using a mixed-method approach will enrich the existing literature on PLN. Referring to the trending

phenomenon of using social media among teacher learning communities in all countries, the topic of elements of PLN experiences is exciting, and it is essential to investigate, including background research in developing countries such as Indonesia. This research does not only describe the level of teacher experience in participating in PLN experiences. This research is complemented by exploring the factors that have led them to engage in PLN experiences. Previous study emphasized that conducting a more in-depth investigation of PLN experiences' elements can generate essential knowledge that can change teachers' "how and why" views engaging with PLN (25). In recent years, many educators have turned to participatory online affinity spaces for professional growth with peers who are more accessible because of reduced temporal and spatial constraints. Specifically, professional learning networks (PLNs) are "uniquely personalized, complex systems of interactions consisting of people, resources, and digital tools that support ongoing learning and professional growth that has increased in popularity with the rise of social media (26). We offer a model for educators and teachers to consider key elements of PLN experiences: engaging, discovering, experimenting, reflecting, and sharing. This model can give educators a window into possibilities and a mirror for reflection as they build or improve their PLNs (25). He also emphasized that technology can encourage a shift in the possibilities and challenges of reason and how teachers engage, discover, experiment, reflect, and share. Thus, the level of PLN experiences and the reasons for their engagement are investigated and discussed in this study. The research attempts to investigate the Indonesian teacher experiences by focusing on the dynamics of teacher engagement in PLNs. Specifically, it will answer two research questions. First, what is the teachers' experience level engaged in social media-based PLN? Second, what are the reasons they are engaged in social media-based PLN?

Methodology

Research Design

Mixed methods and sequential explanatory approaches were used in this research. Qualitative findings are used to explain, refine, clarify, or expand quantitative results (27). The quantitative

data reveals teachers' level of experience engaged in PLN based on elements of PLN experiences. Furthermore, qualitative data is collected and analyzed sequentially to investigate why they are

engaged in social media-based PLN. Thus, this research's flow consists of five phases: a quantitative method, a qualitative approach, and an interpretation, as shown in Figure 1.

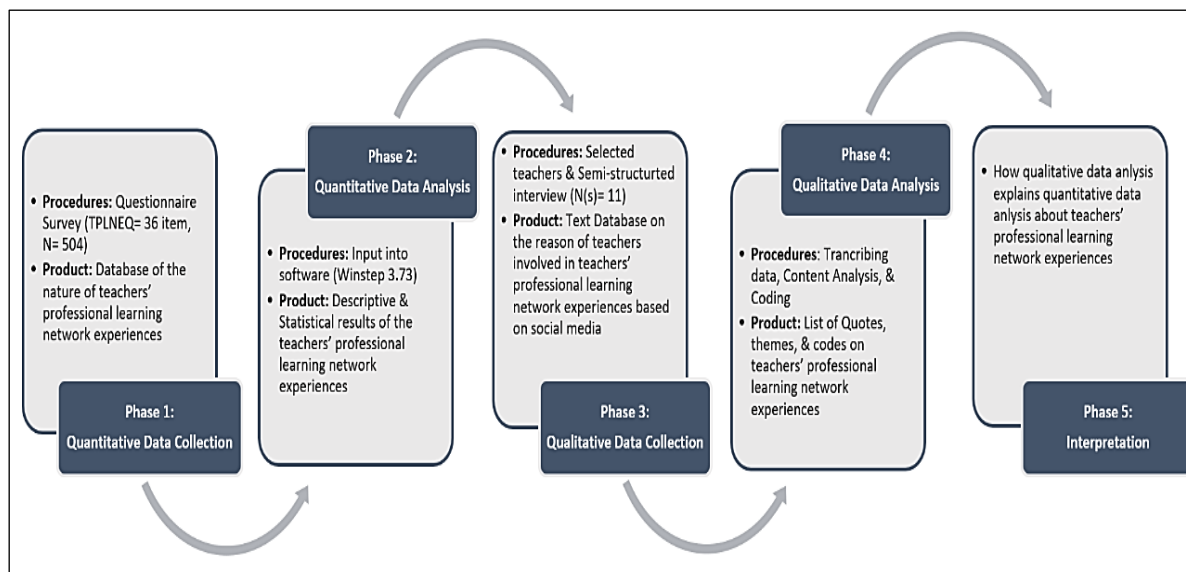


Figure 1: Research Design

Research Settings

For this research to answer two research questions, the teachers who participated in this research were those who participated in PLN activities in their teacher community. The teacher community must be valid and convincing in that it is a consistent community that carries out various PLN activities through social media as its activity space. Therefore, the researcher managed to find three valid communities that are worthy of being studied. Thus, the research was conducted on three teacher communities in Indonesia. First, Komunitas Guru Belajar Nusantara (KGBN), with a population of 61 thousand teachers on Facebook (as of 23/12/2023). Second, Forum Guru IPS Indonesia (FOGIPSI) has a population of members on Facebook of 20 thousand teachers (as of 23/12/2023). Third, Sarasehan Dalam Jaringan Ikatan Guru Indonesia (SADAR IGI), with a population of 5 thousand teachers in 17 WhatsApp Groups (as of 23/12/2023).

The three communities were chosen because they implement PLN based on social media such as Facebook, Instagram, Telegram, YouTube Channel, WhatsApp, Zoom, and Webex. They use social media to interact, discuss study plans, carry out lessons, and reflect on teacher learning. They use WhatsApp and Telegram to communicate and interact, building and strengthening networks

between teachers. In it, they discuss and map the needs and problems of teachers that need to be solved through joint learning activities. In the period before the Covid-19 pandemic, social media was used for chat-based learning activities. Entering the COVID-19 pandemic, Webex, Zoom, YouTube Channel, and Instagram Live became a learning space for teacher community members. The community's WhatsApp, Telegram, Instagram, Facebook, and YouTube channels are media for socialization and appreciation of the learning process, implementation process, and results, as well as the process and results of their reflection.

Participants and Context

For the quantitative phase, the research sample consisted of 504 teachers who participated in professional learning networks in three teacher-learning communities in Indonesia, namely KGBN, FOGIPSI, and SADAR IGI. Based on the sample size determination table, the sample size sufficiently represents the teacher population in the three teacher communities at a significance level of 0.05 (28). The three communities' activities are based on social media such as Facebook, Instagram, Telegram, YouTube Channel, WhatsApp, Zoom and Webex Meetings. They use social media to interact, discuss plans, implement, and reflect on teacher learning. Respondents comprised 318 (63.10%) female and 186 (36.90%) male. A total of 65 people

(12.90%) aged 21-30 years old, 215 people (42.66%) aged 31-40 years old, 167 people (33.13%) aged 41-50 years old, and 57 people (11.31%) aged 51-60 years old. They come from 8 island groups in Indonesia (Sumatra, Bangka and Riau Island, Java and Madura, Bali and Nusa Tenggara, Kalimantan, Sulawesi, Maluku and North Maluku, Papua) and 30 provinces in Indonesia. All respondents were interviewed anonymously and voluntarily to maintain the ethics of this study. Respondents completed questionnaires online via links circulated on social media groups in the three teacher communities.

For the qualitative phase, the participants are 11 teachers who participated in one of the professional learning networks in three teacher communities in Indonesia, namely KGBN, FOGIPSI, and SADAR IGI. They come from 6 cities in Indonesia (Pekalongan, Semarang, Kediri, Batu, Malang, and Makassar). The samples were determined based on three criteria: completing and sending complete questionnaires, actively participating in or managing one of the teachers learning communities, and being willing to be interviewed.

Instrumentations

The teachers' Professional Learning Network Experiences Questionnaire (TPLNEQ) is used to retrieve research data in the quantitative phase. The instrument was developed by researchers regarding the concept of the five key elements of teachers' professional learning network (PLN) experiences, namely "engaging, discovering,

experimenting, reflecting, and sharing" (25). The five key elements are used as indicators to measure teachers' PLN experiences. These indicators are developed into 36 items, consisting of engaging (10 items), discovering (8 items), experimenting (6 items), reflecting (6), and sharing (6). TPLNEQ consists of a 4-point Likert-type scale for all items, from never (point: 1) to always (point: 4). The instrument was disseminated online via the social media groups of 3 teacher communities. There are 504 filled instruments, and then the quantitative data processing will be done.

Based on the Summary Statistic (Table 1.1 and Table 1.2), the person's reliability is 0.94. Based on the table criteria of scale instrument quality (29, 30), the person's reliability is excellent. The table also shows that the reliability of the item is 0.99 and classified as excellent. The item's reliability suggests that the probability of persons responding to items was likely high, and the items defined the latent variable very well (29). The data also shows that the Cronbach Alpha coefficient is 0.95 and is classified as excellent according to the table criteria of scale instrument quality (30, 31). This classification indicates a high level of interaction between a person and an item. The Summary Statistic Table also shows that the Person Separation index is 3.88 and the Item Separation index is 10.22, indicating a good spread of TPLNEQ across the range of respondents and items. This means that TPLNEQ is appropriate and reliable in identifying teachers' experience levels in social media-based PLN.

Table 1.1: Summary Statistic Table-Person

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	103.8	36.0	.97	.30				
S. D.	15.7	.0	1.45	.12				
MAX.	144.0	36.0	8.01	1.84				
MIN.	62.0	36.0	-2.12	.25	.12	-5.9	.12	-5.7
REAL RMSE	.036	TRUE SD	1.40	SEPARATION	3.88	Person RELIABILITY	.94	
MODEL RMSE	.033	TRUE SD	1.41	SEPARATION	4.28	Person RELIABILITY	.95	
S. E. OF Person MEAN	= .06							
Person RAW SCORE-TO-MEASURE CORRELATION	= .98							
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY	= .95							

Table 1.2: Summary Statistic Table-Item

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	1453.6	504.0	.00	.08	.98	-.7	1.00	-.4
S. D.	144.4	.0	0.84	.00	.28	3.8	.27	3.7
MAX.	1638.0	504.0	2.42	.09	2.00	9.9	1.95	9.9
MIN.	1005.0	504.0	-1.17	.07	0.63	-6.4	.64	-6.2
REAL RMSE	.08	TRUE SD	.84	SEPARATION	10.22	Item RELIABILITY	.99	
MODEL RMSE	.08	TRUE SD	.84	SEPARATION	10.65	Item RELIABILITY	.99	
S. E. OF Item MEAN = .14								
UMEAN= .0000 USCALE= 1.0000								
Item RAW SCORE-TO-MEASURE CORRELATION = -1.00								
18036 DATA POINTS. LOG-LIKELIHOOD HI-SQUARE: 30085.27 with 17498 d.f. p= .000								

An estimate of how well the instrument measures what should be measured can be indicated by the Standardized Residual Variance (Table 2). In Table 2, TPLNEQ has raw variance explained by a measure of 45.7% and an unexplained variance of 11.6%. According to the table of criteria for scale instrument quality, the minimum requirement for raw variance explained by measure is 20%, and if

the value is more than 40%, then it is even better, and the unexplained variance ideally should not exceed 15% (30,31). Thus, TPLNEQ has a good unidimensionality measure, which is considered helpful in measuring what should be measured. In other words, TPLNEQ effectively measures the teachers' experience level in social media-based PLN.

Table 2: Standardized Residual Variance

	--	Empirical	--	Modeled
Total raw variance on observations =	66.3	100.0%		100.0%
Raw variance explained by measures =	30.3	45.7%		45.2%
Raw variance explained by persons =	15.5	23.3%		23.1%
Raw variance explained by items =	14.8	22.4%		22.1%
Raw unexplained variance (total)	36.0	54.3%	100.00%	54.8%
Unexplained variance in 1st contrast =	7.7	11.6%	21.4%	
Unexplained variance in 2nd contrast =	4.2	6.4%	11.7%	
Unexplained variance in 3rd contrast =	3.7	5.5%	10.2%	
Unexplained variance in 4th contrast =	2.1	3.2%	5.9%	
Unexplained variance in 5th contrast=	1.7	2.6%	4.8%	

For the qualitative phase, interviews were conducted to explore why respondents were engaged in social media-based PLN. For this reason, semi-structured interviews were chosen to obtain data and refer to an open-ended question guide regarding the reasons for engaging in social media-based PLN. Interviews were conducted face-to-face and online, with a duration of 20 to 30 minutes, and conducted 2 to 3 times. All talks in the interview were recorded through a recorder application on smartphones and personal computers. Also, responses and answers that were considered necessary were noted as research findings. Qualitative data validity was carried out through the use of validity strategies (32), which is manifested in the form of a variety of research informants (from three teacher community

members), a variety of research data (interview and observation), carrying out additional checks to ensure the accuracy of the results, and providing a complete explanation of the findings. The researcher also intensively observed the three communities' social media activities and PLN activities, followed by the informant teachers of the research. The researcher even engaged with the teachers in various PLN activities in the three communities studied. The strategy taken by the researcher was an effort to implement triangulation in this research.

To ensure the credibility of the research, the researcher directly quoted the informants' responses to be used in analyzing and interpreting the data. In addition, to maintain external credibility, the researcher made every effort to ask

questions during the interview by remaining neutral or impartial or directing answers so that they were natural and found the respondents' views, known as naturalistic inquiry (33). Thus, each respondent expressed their views and opinions freely and openly regarding their PLN experiences.

Data Analysis

For the quantitative phase, the software in the form of a Rasch measurement model, otherwise known as WINSTEPS version 3.73, was used in this study. Rasch analysis is a method to obtain a goal, fundamental, additional measures (qualified by the standard error and statistical quality control conformity) from stochastic observations of ordered category responses (34). At the initial stage, it is used to determine the validity and reliability of the instrument. Through software, the data is mathematically transformed into logits (odd logarithmic units) through the logarithmic function. Then, this function is used to convert raw ordinal (Likert-type) data into the same interval scale. The measurement model is calibrated by a conjoint measurement process (29, 31). Furthermore, the output data is used to map the teachers' experience levels in each of the elements of PLN experiences.

For the qualitative phase, the following research step checks its validity after the data has been collected through interviews. This step is crucial in qualitative research before the data is analyzed and directed at research finding and conclusion. Refers to the data validation process in qualitative research (32), the validity strategies carried out are in the form of triangulating various sources of

information data, namely by interviewing more than two respondents for each teacher learning community that runs Social media-based PLN; each member of the research team scrutinized the data to check the accuracy of the qualitative findings; describing rich and diverse data to convey findings; spending a long time in the field, namely by conducting more than two interviews for each respondent, while observing and recording research findings that are considered essential and relevant.

After the data is believed to be valid, the following research step is to analyze and interpret it. This study refers to the steps of data analysis and interpretation proposed by John W. Creswell, namely: 1) reading the entire data to obtain a comprehensive picture of the results of data collection, 2) identifying data, 3) coding, namely the process of segmenting in labeling the collected data, 4) examining the data in detail, 5) describing the data to get an overview of the answers to the research questions or problem formulations, and 6) developing themes or categories of ideas on the data obtained (32).

Results

The Level of Experiences of the Teachers Engaged in Social Media-Based PLN

Based on the research data, the following describes the teachers' level of experiences engaged in 3 social media-based PLN in Indonesia, namely KGBN, FOGIPSI and SADAR IGI. Furthermore, the research data for each element of PLN experiences are described in detail below.

Table 3: Summary Statistic Table-Person of Engaging Elements

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	28.0	10.0	.93	.63				
S. D.	5.9	.0	2.09	.26				
MAX.	40.0	10.0	6.64	1.86				
MIN.	13.0	10.0	-3.66	.50	.13	-3.3	0.13	-3.2
REAL RMSE .74		TRUE SD	1.96	SEPARATION	2.66	Person RELIABILITY	.88	
MODEL RMSE .68		TRUE SD	1.98	SEPARATION	2.92	Person RELIABILITY	.89	
S. E. OF Person MEAN = .09								
Person RAW SCORE-TO-MEASURE CORRELATION = .98								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .90								

On the engaging elements, Table 3 shows the overall mean score of 0.93 logit, standard deviation

2.09, minimum measure -3.66, maximal measure 6.64, and separation 2.66. Based on this data, the

engaging elements can be categorized using Person Strata formulas (30, 35). The result person levels in this element are divided into four classes: Very High (4.07 - 6.64), High (1.50 - 4.06), Moderate ((-1.08) - 1.49) and Low ((-0.366) - (-1.09)).

With the overall mean score of 0.93 logit, the person levels for the engaging elements are Moderate. Table 4 explains the category of person levels for the engaging elements.

Table 4: Frequency Distribution of Engaging Elements

Elements of PLN experiences	Very High		High		Moderate		Low	
	F	%	F	%	F	%	F	%
Engaging	48	9.5	96	19	300	59.5	60	11.9

Table 5: Summary Statistic Table-Person of Discovering Elements

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	25.7	8.0	4.73	1.30				
S. D.	4.0	.0	3.56	.45				
MAX.	32.0	8.0	10.39	1.86				
MIN.	16.0	8.0	-3.56	.71	.00	-1.8	.00	-1.8
REAL RMSE 1.54	TRUE SD 3.21	SEPARATION 2.09	Person RELIABILITY .81					
MODEL RMSE 1.38	TRUE SD 3.29	SEPARATION 2.39	Person RELIABILITY .85					
S. E. OF Person MEAN = .16								
Person RAW SCORE-TO-MEASURE CORRELATION = .99								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .94								

On discovering elements, Table 5 shows that the overall mean score of 4.73 logit, standard deviation 3.56, minimum measure -3.56, maximal measure 10.39, and separation 2.09. Person levels on this element are divided into three classes: High (5.74 -

10.39), Moderate (1.09 - 5.73), and Low (1.08 - (-3.56)). With the overall mean score of 4.73 logit, the person levels at element discovering are Moderate. Table 6 explains the category of person levels in discovering elements.

Table 6: Frequency Distribution of Discovering Elements

Elements of PLN experiences	High		Moderate		Low	
	F	%	F	%	F	%
Discovering	195	38.7	234	46.4	75	14.9

Table 7: Summary Statistic Table-Person of Experimenting Elements

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	15.8	6.0	.45	.85				
S. D.	3.2	.0	2.35	.22				
MAX.	24.0	6.0	8.03	1.95				
MIN.	8.0	6.0	-4.72	.76	.11	-2.2	.11	-2.0
REAL RMSE 1.00	TRUE SD 2.12	SEPARATION 2.12	Person RELIABILITY .82					
MODEL RMSE .88	TRUE SD 2.18	SEPARATION 2.47	Person RELIABILITY .86					
S. E. OF Person MEAN = .10								
Person RAW SCORE-TO-MEASURE CORRELATION = .98								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .82								

On the experimenting elements, Table 7 shows the overall mean score of 0.45 logit, standard deviation 2.35, minimum measure -4.72, maximal measure 8.03, and separation 2.12. Person levels on this element are divided into three classes: High (3.80 -

8.03), Moderate ((-0.46) - 3.79), and Low ((-4.72) - (-0.47)). With the overall mean score of 0.45 logit, the experimenting element levels are Moderate. Table 8 explains the category of person levels for experimenting elements.

Table 8: Frequency Distribution of Experimenting Elements

Elements of PLN experiences	High		Moderate		Low	
	F	%	F	%	f	%
Experimenting	33	6.5	306	60.8	165	32.7

Table 9: Summary Statistic Table-Person of Reflecting Elements

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	17.6	6.0	2.58	1.47				
S. D.	3.1	.0	3.58	.47				
MAX.	24.0	6.0	9.87	1.92				
MIN.	9.0	6.0		.82	.00	-1.7	.00	-1.7
REAL RMSE 1.76		TRUE SD 3.12	SEPARATION 1.77			Person RELIABILITY .76		
MODEL RMSE 1.54		TRUE SD 3.23	SEPARATION 2.10			Person RELIABILITY .81		
S. E. OF Person MEAN = .16								
Person RAW SCORE-TO-MEASURE CORRELATION = .99								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .92								

On the reflecting elements, Table 9 shows the overall mean score of 2.58 logit, standard deviation 3.58, minimum measure -6.19, maximal measure 9.87, and separation 1.77. Person levels on this element are divided into three classes: High (4.53 -

9.88), Moderate ((-0.83) - 4.52), and Low ((-6.19) - (-0.84)). With the overall mean score of 2.58 logit, the reflecting element levels are Moderate. Table 10 explains the category of person levels on the reflecting elements.

Table 10: Frequency Distribution of Reflecting Elements

Elements of PLN experiences	High		Moderate		Low	
	F	%	F	%	f	%
Reflecting	105	20.8	330	65.5	69	13.7

Table 11: Summary Statistic Table-Person of Sharing Elements

	Total Score	Count	Measure	Model Error	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
MEAN	16.7	6.0	1.48	1.19				
S. D.	4.2	0	3.99	.32				
MAX.	24.0	6.0	8.71	1.87				
MIN.	6.0	6.0	-8.36	.81	.01	-2.0	.01	-2.0
REAL RMSE 1.39		TRUE SD 3.73	SEPARATION 2.68			Person RELIABILITY .88		
MODEL RMSE 1.23		TRUE SD 3.79	SEPARATION 3.08			Person RELIABILITY .90		
S. E. OF Person MEAN = .18								
Person RAW SCORE-TO-MEASURE CORRELATION = 1.00								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .95								

On sharing elements, Table 11 shows the overall mean score of 1.48 logit, standard deviation 3.99, minimum measure -8.36, maximal measure 8.71, and separation 2.68. Person levels for this element are divided into four classes: Very High (4.45 -

8.71), High (0.18 - 4.44), Moderate ((-4.09) - 0.17), and Low ((-8.36) - (-4.10)). With the overall mean score of 1.48 logit, person levels at element sharing are High. Table 12 explains the category of person levels in terms of sharing elements.

Table 12: Frequency Distribution of the Sharing Elements

Elements of PLN experiences	Very High		High		Moderate		Low	
	F	%	F	%	f	%	f	%
Sharing	90	17.9	252	50	123	24.4	39	7.7

The Diversity of Reasons for Being Engaged in Social Media-Based PLN

In this phase, interviews were conducted with respondents in a semi-structured manner. The interviews' results were grouped into seven data codes: learning process, according to needs, roles, and positions, sharing and collaboration, learning from fellow teachers, practice-oriented, and a culture of reflection. Research respondents gave various responses when asked why they were engaged in Social media-based PLN.

The interview results show that community teachers are encouraged to engage in PLN-based social media because of its well-maintained learning atmosphere. Teachers feel facilitated to continue learning to improve their teaching practice and professionalism. One respondent expressed this: "The more learning, the more interesting, the more references, and the more effort to implement" (*Niam, principal of an elementary school member of the teacher community*). The other respondents said, "The teacher community provides a refresher to restore the enthusiasm of teachers in learning and teaching." (*Rina, elementary school teacher, member of the teacher community*) and "The community encourages me to learn again, reflect again, find new things, and learn continuously to be adaptive to the changes that occur in students." (*Anik, early childhood teacher, member of the teacher community*). Another respondent is described below.

The teacher community combines two activities: teachers and people who continue to learn. The formulation of this activity is visible in the field. For example, if a teacher has to teach while he does not have a laboratory, he has to learn how to provide the same competence to his students without these facilities. That is a natural learning process. (*Usman, junior high school teacher, teacher community manager*).

Everything teachers learn through PLN's social media-based platform facilitated by the teacher community suits their needs. There is a need to improve the quality of teaching, which will impact students. They feel that everything they learn is practical things needed to solve various problems in their daily teaching in the classroom. So, according to needs and practice-oriented, teachers are also a reason to be involved in PLN's social media-based activities. This was expressed by one

respondent: "Many simple good practices that we never thought of before that we get in the community. A small thing, but it ends up bringing the class to life. So that it is more meaningful for students." (*Devy, vocational high school teacher, teacher community manager*). The other respondents said, "The goals in the teacher community resonate with the teacher and match the teacher's needs." (*Rina, elementary school teacher, member of the teacher community*) and "The community gets practical things from the teachers. We get material from fellow teachers who are equal, which they happen to have practiced first." (*Devy, vocational high school teacher, teacher community manager*). Another respondent is described below.

Activities in the teacher community allowed me to study again for free. This opens space to bridge my needs as a teacher, continuously developing myself in my profession and introducing various applications that can support IT-integrated learning activities. (*Deni, junior high school teacher, member of the teacher community*).

In addition, during the learning process, teachers feel they are treated equally in their roles and positions. Respondents expressed this: "In every lesson, I feel good respect for everything the teachers say; everything is appreciated, the term is appreciated. All participants are considered equal" (*Dian, primary school teacher, member of the teacher community*). This is because they learn from fellow teachers who have good teaching practices. The learning atmosphere is like there is no barrier between resource persons and participants because they are teachers. The other respondent said, "If we learn from the same teacher, we do not seem to have any distance/barrier, so it is pleasant to discuss share without seeing seniority. It is what makes me feel more comfortable in the community." (*Herdy, elementary school teacher, teacher community manager*) and "In the teacher community, there are almost no barriers; teachers, school principals or others; learn together. That is where I want to come." (*Devy, vocational high school teacher, teacher community manager*). Another reason is that "We get material from fellow teachers who are equal, which they happen to have practiced first. Many simple good practices that we never thought of before that we get in the community." (*Devy, vocational high school teacher, teacher community*

manager) and "In the community, we learn with fellow teachers. We learn from seniors or experts, sometimes not necessarily according to our students' conditions. If we learn from the same teacher, we have no boundaries/barriers, so the discussion is good." (*Herdy, elementary school teacher, teacher community manager*).

In addition, the respondents felt interested because they were allowed to share and collaborate with fellow teachers. This was expressed by respondents that "In the teacher community, collaboration puts forward the enthusiasm of all students, all teachers." (*Rina, elementary school teacher, member of the teacher community*) and "If we learn from the same teacher, we do not seem to have any distance/barrier, so it is pleasant to discuss, share without seeing seniority. It is what makes me feel more comfortable in the community. So we are mutually sharing, collaborating." (*Herdy, elementary school teacher, teacher community manager*).

Lastly, teachers feel comfortable engaging in a social media-based PLN program facilitated by the teacher community because they are given ample opportunity for reflection as a starting point for making changes in their teaching practice. One respondent expressed this: "The community encourages me to study again, reflect again, discover new things." (*Anik, an early childhood school teacher and a member of the teacher community*). Another respondent is described below.

The habit of reflection is also one thing that makes me feel comfortable in the teacher community. That is important because it encourages me to change every teaching activity to carry out different things occasionally. After all, the characteristics of students and material are also different. This is interesting. (*Herdy, elementary school teacher, teacher community manager*).

Based on the data above, it can be said that the reason teachers are engaged in social media-based PLN is that they are facilitated to learn according to their needs, placing them in equal roles and positions, providing opportunities for sharing and collaboration, emphasizing learning strategies from fellow teachers, inspire good practices that impact students, and encourage reflection.

Discussion

The Level of Experiences of the Teachers Engaged in Social Media-Based PLN

The research data shows that the personal levels of the engaging elements are at a Moderate level, which means that the average experience of the respondents with these elements is moderate. Teachers engaging in PLN could be manifested in several ways, from attending school meetings or local conferences to building networks with fellow teachers worldwide in a virtual space (25). The data shows that 11.9% of teachers still have low engagement levels, which means that they have not used their membership to be engaged intensively in various activities in social media-based PLN. Theoretically, when teachers are active in professional development activities, such as social media-based PLN, they naturally interact with other teachers. Then, there is increased collaboration, which encourages high engagement. Conversely, when engagement decreases, it will encourage the collapse of collaboration and lead to the potential for increased isolation in itself (36). Those still low in this element need to be developed again so that their activities encourage a learning process that can increase their competence and professionalism. Because the learning process will occur in a learning community, if members "feel engaged" in learning and practice together in the community, in time, it will encourage them to develop "an identity of belonging" (37, 38).

However, teachers who are active in a teacher community, such as members of the Social media-based PLN, have different cultures in interpreting their engagement. The results of a study that uses historical activity cultural lens theory in the online community of mathematics teachers show that they can be classified into four groups: contemplators (they do not only read but think about whatever is posted), curators (they do not just collect, but organize the ideas and information they get); crowdsourcer (they hope and ask for information from fellow community members); and contributors (they often write and respond to posts (39). The results of other studies show that the actions of expert teachers in the online space can be grouped into four categories of engagement: Info-Consumers (those whose activities read any

posts), Info-Networkers (those who do not read enough but also share posts), Independent Search Contributors (those who post and/or respond to posts when getting feedback or help), and Vocationalists (those who actively post and also respond to posts to liven up the network in the community and have a focus on building a profession) (40). Teachers engaged in various actions interpreting engagement in a PLN are influenced by many factors such as social and spatial changes, desires and ideals, timing, ease and disorder with digital space, local themes and individual life, relationships, and online presence (14). These are interconnected and form mindsets and actions for teachers regarding how and why they are engaged with the PLN.

Picard further explained that teacher professional development and the cultural context could not be separated easily, so a theoretical understanding of the meaning of engagement is needed concerning the learning culture and the development of teacher professionalism (36). In line with this, teachers' engagement in (informal) teacher professional learning is influenced by school culture (41). Referring to this, the learning culture at a social media-based PLN will promote or increase teacher engagement in the professional learning it organizes. Besides, this good learning culture will provide a basis for quality social media-based PLN. When a thick learning culture develops, the members (teachers) become more engaged to increase the absorption of their professional development. The increased element of engagement will likely encourage effective professional learning networks. Every teacher learning community that runs a social media-based PLN needs to maintain a learning culture; it even needs to continue, improve, and maintain consistency of engagement of its members (42). Thus, it will increase the diversity of knowledge and teaching practices it has.

Also, the first thing that develops when teachers engage is the professional learning facilitating them: to learn fun, engaging activities, valuing each person and positioning them as an essential part of achieving their goals (43). Theoretically, to ensure that its members are engaged and constant in professional learning activities, any social media-based PLN needs to maintain a fun and exciting learning experience. Professional learning should ensure that it has something to do with teachers'

real tasks and daily activities to increase participation (44). Besides, it is also necessary to pay attention to the needs and aspirations of teachers. In teacher professional development, it is necessary to categorize teachers according to individual professional needs and aspirations so that they can become the basis for designing professional development programs that follow the specific needs of teachers (45). Another study, suggests that one of the concerns that need to be given to a teacher's continuous professional development program is planning a curriculum that offers content that is mapped following the needs of teachers, even needs to be differentiated according to the characteristics of teachers, such as on professional life phases (46). Thus, when teachers feel emotionally supported and empowered to realize improvements in teaching practice, the learning community teaches a cycle of continuous engagement (47).

The research data shows that the personal levels of discovering elements are Moderate, meaning that respondents' average experience with this element is moderate. Teachers can discover when they find and gain insight into new ideas in their learning practices, learning resources, learning models, and strategies (25). Research data shows that 14.9% of teachers still have low levels of discovering elements. They have not had the maximum discovery experience while participating in social media-based PLN in their learning community. When they join the social media-based PLN, they are facilitated to connect and interact intensively with fellow teachers of various backgrounds. Includes the diversity of their thinking related to their learning practices and learning resources, models, and learning strategies they have practiced in their classes. Research shows that through interactions in cyberspace, teachers find ample opportunities to collaborate. The teacher-learning community provides a vast opportunity by utilizing social networking technology. Every individual everywhere can engage in a collegial collaboration to experience discovering various acceptable practices and increase teaching spirit. A study shows that many connections allow them to get a lot from their interactions with their PLN and let them, through their discovering experiences, get information in the form of resources, ideas, links, and lesson plans.

Subsequent research data shows that the personal levels of the experimenting elements are moderate, which means that the average respondent's experience with this element is moderate. Teachers implement various concepts, ideas, methods, strategies, media, and learning resources in these experimenting elements. They carry out experiments to implement completely new ideas or have modified new ideas with their teaching experiences that have been done so far. The research data shows that 32.7% of teachers are still low, and only 6.5% have high experience in the experimenting elements. Data shows teachers' tendency to implement various things they get through learning activities at social media-based PLN is still not optimal. However, despite the average being moderate, research data shows that 67.3% of teachers who consistently follow social media-based PLN admit that they have tried to apply various concepts, ideas, methods, strategies, media, and resources. What they learn through PLN is based on the social media they follow. Experimenting with applying various concepts, ideas, methods, strategies, media, and learning resources in their classrooms directly impacts their teaching practice. The ultimate goal is not only that but also to improve the quality of their student's learning processes and outcomes. In addition, of course, this action is a form and effort to solve problems in teacher and student learning. In this case, professional learning can strengthen their theoretical understanding and become the basis for changing principles in their classroom teaching practice. The theoretical foundation provides teachers with the tools to understand what they need to change and contribute sustainably to a school culture that is committed to continuous improvement and innovation by implementing problem-solving practices or improving existing practices so that professional learning can develop teachers' professionalism as adaptive experts who work in schools with high adaptive capacity (48, 49).

In one study, teachers' paradigms of their teaching practices, reluctance to change their teaching strategies, and unwillingness to deviate from their traditional teaching practices were seen as significant obstacles to implementation regarding changes in teacher teaching practices (50). Furthermore, these individual-level factors are the most significantly associated with changes in

school teaching practice. So, at the individual teacher level, the following factors can influence teachers in implementing new teaching practices: teacher 'ability,' teacher confidence, perceptions of teaching and learning, and teacher reluctance (50). Social media-based PLN must provide broad opportunities for its members to improve these factors during professional learning. Also, it is necessary to facilitate participants to discuss what they have learned from PLN; then, they can apply them to their learning environment, including learning by doing, mentoring, writing reflections, and exploratory learning (51). Thus, there are no longer obstacles for teachers to improve their experimenting experience, and the results of the professional learning process can immediately impact their students.

The research data shows that the personal levels of the reflecting elements are at a Moderate level, which means that the average experience of the respondents on this element is moderate. The teachers reflect by introspecting and evaluating the implementation or experimenting process of their teaching practices. Reflecting can determine the impact of changes in the learning process and its effects on students' learning abilities and experiences. In the context of PLN, reflection becomes an essential element of nature. Identifying strategies to improve or change teacher teaching practices and reflecting on this experimenting process is done by evaluating their students' impact (25). Besides, the collective reflection that is sometimes carried out in the PLN forum can encourage teachers to participate in PLN. Not only to share knowledge but also to practice good teaching along with its strengths and weaknesses. They also find self-awareness about critical issues in their teaching practice while learning to reflect on their teaching practices.

As agreed with previous studies, social media-based PLN needs to prepare teachers (members) as reflective practitioners. Moreover, it becomes essential to their professional learning journey (52, 53). Previous studies show that their engagement in reflection on teaching practice was considered a major catalyst for building teacher capacity to continue learning and improving student learning quality (53, 54). Besides, effective social media-based PLN provides teachers with new knowledge and skills. Social media-based PLN needs to facilitate them to reflect on their teaching

practices and reflective writing that will enable them to understand and articulate their pedagogical knowledge and teaching practice and enhance their ability to find solutions to problems they face in the context of their teaching practice (53, 55, 56). Experimenting and reflecting that have been described show continuity between what teachers learn at PLN based on social media, then implemented and followed by a reflection process. Reflection results lead them to re-learn and correct weaknesses or improve implementation results. Thus, teachers consistently maintain their motivation to continue learning at PLN based on social media to continue to improve and improve student learning, teaching practice, and professional practice. This being a kind of sustainability, about continuous improvement in student outcomes and professional practice (49).

The research data shows that the personal levels of sharing elements are high, which means that the average respondent's experience with this element is high. The data shows that 50% of respondents are at the High level, and 17.9% are at a very high level. Each social media-based PLN carries out a multi-directional communication and interaction process to disseminate information, knowledge, skills, and various sources in these sharing elements. This sharing is carried out for two purposes: program socialization and implementing the professional learning process itself. A study shows that sharing knowledge in the teacher-learning community is proven to help other teachers in two main ways: assisting fellow teachers to gain new insights and ideas and helping fellow teachers to stay up to date with the latest knowledge (57). The main media for socializing the professional learning program they use are WhatsApp, Facebook, Telegram, and Instagram. Meanwhile, Zoom, Google Meet, Webex, and YouTube are leading media for professional learning activities.

The high level of experience in this sharing element shows that teachers are not only active in sharing information. They are actively honing and demonstrating their teaching practices, increasing other teachers' competence among PLN members, and improving student learning processes and outcomes. This high experience level is possible because of their high motivation for sharing. A study shows that collectivism and principals are

the primary motivators for teachers who like to share knowledge so that other teachers gain new knowledge and demonstrate current knowledge (57). Through this sharing element, PLN provides teachers with greater access to ideas from other teachers regarding information and good classroom teaching practices (25). Besides, by participating in sharing activities from time to time, community members (teachers) have developed a professional identity and its meaning for their professional development as teachers, encouraging them to move as a community, not as individuals (47). Sharing knowledge about teaching practice and how it is implemented, sharing knowledge, and research based on teaching practice is likely to be more meaningful and closer to the community's needs (58). However, some members/participants of social media-based PLN are passive in this sharing element. A study shows that there are several reasons for those with this attitude: they feel that they do not need to share or post, think that sharing will not be helpful for other teachers, want to know the dynamics of the community before actively sharing, and there is a technical problem in sharing (59).

The Diversity of Reasons for Being Engaged in Social Media-Based PLN

Based on interview data with respondents, they are engaged in social media-based PLN for various reasons. Here are their reasons: facilitating the learning process according to their needs, placing them in equal roles and positions, giving opportunities to share and collaborate, emphasizing learning strategies from fellow teachers, inspiring good practice that impacts students, and encouraging reflection. The reasons they put forward in this study are in line (some more concrete) with previous studies. For example, there are various reasons participants (teachers) want to engage in online teacher learning communities: sharing feelings and emotions, taking advantage of the benefits of online learning, overcoming self-isolation, exploring new ideas, and making friends (60). The findings align with studies of professional learning facilitated by social media. For example, Twitter showed that respondents stated they were engaged because there were ample opportunities to engage with colleagues, overcome isolation, and encourage sustainable relationships,

collaboration, and a strong community (61). In simple terms, the various reasons why teachers join social media professionally are knowledge construction, knowledge sharing, a culture of collaboration, flexibility, and accessibility, and building a professional community (40).

Besides, the first thing that develops when teachers are engaged in professional learning is that they consider the professional learning fun and engaging, appreciate it personally, and see it as necessary to achieve their goals (43). Teachers are engaged in PLN to grow professionally, learn from others, and contribute to the community. The motivation is that they can ask for help and support and help others by showing and sharing knowledge and interacting with fellow teachers regarding the latest information and feedback (62). Another study explained that teachers participate in PLN because they can get and share information, exchange opinions, follow developments in research and good practices, collaborate with experts, build networks with teachers, and inspire them to become better teachers. PLN provides support when they need assistance (26).

The author's view is that the respondents' reasons for engaging in social media-based PLN are the basis for further engaging in PLN experiences with each element. Although it needs to be investigated further, it can draw an opinion. When their reasons for joining social media-based PLN activities are increasingly proven during professional learning, the possibility of experiences with elements engaging, discovering, experimenting, reflecting, and sharing will also improve. The learning experience through PLN could be a linear process, starting with engagement and ending with sharing. Still, it could also not start from actstartaring to reflecting (25). As reflected in the model, each element is connected by a two-way arrow representing a holistic relationship between them. Thus, every teacher community that runs a social media-based PLN needs to build and maintain a learning experience; that is why its members join and are actively engaged in learning therein.

Actively engaged in learning requires a lot of support from various stakeholders within PLN itself. Several domains play a role in encouraging teacher participation in PLN in the context of improving teacher professionalism: leadership and its structure play an essential role in PLN,

structured activities related to teachers' daily practices, have common goals that the participants internalize and strong collaboration (63). Also, the external PLN is needed to support teachers engaged in the activities of a PLN, especially school management. A study shows that it is essential for schools to create work methods in schools that enable and encourage communication, process reflection, and openness among teachers (64). For example, if teachers are facilitated to develop their ideas, this is an essential signal for school improvement and appreciation of teachers' good teaching practices. Supporting facilities, space, and time for teachers to be active in social media-based PLN is undoubtedly an alternative to making it happen. Another study concluded that teacher professional learning (for example, social media-based PLN) could not be understood as a linear process of delivering and receiving from administrators to teachers only. They must be seen as complex, multi-directional, and characterized by dynamic components (65). In this case, support each other. All discussed in this paragraph can be a consideration for the government and community managers in designing teacher learning activities to improve their professionalism and competence. Considering the various factors that have been reviewed in this paragraph, it is expected that the learning involvement of teachers has the potential to increase to the highest level.

Before 2020, the Indonesian government had facilitated teachers to build PLN activities through the Program Kelompok Kerja Guru (Teacher Working Group Program) and Program Musyawarah Guru Mata Pelajaran (Subject Teacher Deliberation Program). Then, in early 2020, the Indonesian government began to capture and pay attention to the phenomenon of teacher communities. Even creating a Komunitas Belajar Program (Learning Community Program) that directs teachers to build communities at all school levels. However, the program did not run as expected and still needs much improvement (5, 6, 66). The core problem is that the PLN activities that occur in the community are not intensive and sustainable. In addition to teachers not understanding how teacher communities are run, they follow PLN activities in the community only to follow the rules, not because of their desires and needs. This is different from social media-based teacher communities. They build communities, run

communities, and mobilize their members to create various PLN activities voluntarily based on their professional desires and needs as teachers. However, there are multiple dynamics in the level of involvement of its members, as in the results of this study. However, the social media-based teacher learning community is voluntary and non-formal, so when it is made formal, especially with strict rules, teachers do not enjoy community activities because the basis is not their desires and needs. In addition to being a reference for further scientific studies on the topic of professional learning among teachers, the presentation of this study's results should be considered by the Indonesian government in implementing policies and programs to build professional learning through the teacher community in the future.

Conclusion

Teacher professional development that is carried out formally by schools and government authorities often experiences various obstacles and limitations. This condition occurs in Indonesia. Some teachers do not just give up on the constraints and limitations that arise. They form a network that provides an alternative to their professional development process informally, namely through the teacher community that runs PLN. They do their activities using social media, which is getting closer to their lives today. Various social media-based PLNs are currently being formed. This research investigates the experience level of teachers engaged in social media-based PLN and their reasons for being engaged in it. The results show that the level of experiences of the teachers engaged in social media-based PLN has not demonstrated the maximum level of each element of PLN experiences, namely engaging, discovering, experimenting, reflecting, and sharing. Only the sharing element shows a high level of PLN experiences. The reasons given by the teachers when they decided to join could be an essential part of increasing PLN experiences. Managers or administrators of social media-based PLN need to align, maintain, and enhance various activities that facilitate the learning process of teachers according to their needs, place them in equal roles and positions, provide opportunities for sharing and collaboration, emphasize learning strategies from fellow teachers, inspire good practices that have an impact on students, and encourage them always to reflect. This alignment

is expected to maintain teacher engagement in the various learning experiences in social media-based PLN. Ultimately, the consistency will positively impact his engagement in social media-based PLN for improving competence, teaching practices, student learning processes, and outcomes.

The rapid development of social media-based PLN, which aims at the professional development of teachers today, including what is happening in Indonesia, needs to be balanced with the diversity of good and high learning experiences. Thus, it can increase the activities of its participants (teachers) in all elements of PLN experiences: engaging, discovering, experimenting, reflecting, and sharing. The high level of all aspects of the PLN experiences of participants (teachers) will indicate the realization of an effective social media-based PLN. In the future, the elements of the PLN experience, which consist of engaging, discovering, experimenting, reflecting, and sharing, can be an alternative standard for teacher community managers to design various activities in running social media-based PLN for their members. Engaging and Discovering can become a standard during the teaching and learning process at PLN based on social media. This can be realized through various activities that directly involve teachers in re-learning and focusing on activities that facilitate teachers finding new things they need or solutions to problems they face in their teaching practice.

Meanwhile, experimentation, reflection, and sharing can be the standard of follow-up, which focuses on implementing teacher learning outcomes after participating in social media-based PLN. This can be realized through experimental activities on teacher innovation or problem-solving, then reflection actions, and sharing the results of experiments and reflections. All of this will promote the maximum PLN experience for teachers and impact the quality of student learning.

Not only that, every social media-based PLN needs to maintain and continue to improve various activities, which facilitate the learning process of teachers according to their needs, place them in equal roles and positions, provide opportunities to share and collaborate, emphasize peer-to-peer learning strategies, inspires good practices that impact students and encourages them to reflect. These are their reasons for joining and participating in various learning activities at social

media-based PLN. For teachers, whatever the reasons are when joining a social media-based PLN, it is necessary to continue increasing PLN experiences to the highest level. So teachers can realize the usefulness and meaningfulness of teacher engagement in social media-based PLN and improve their competence and teaching practice. To increase teachers' PLN experiences to the highest level, stakeholders need to intervene, from school management to the government authorities that handle the professional development of teachers. Supporting facilities, space, and time for teachers to be active in social media-based PLN is undoubtedly an alternative to making it happen.

This study has limitations, including the small number of samples at the quantitative and qualitative stages. This research has not investigated what factors have made teachers not reach the highest level of their PLN experiences in each of its elements, whether their reasons for joining social media-based PLN affect their level of PLN experiences in the future, whether the level of their PLN experiences will have an effect on the learning process and outcomes of their students. It is hoped that the researcher will carry out future research on this matter to complement this research results.

Abbreviations

FOGIPSI: Forum Guru IPS Indonesia, KGBN: Komunitas Guru Belajar Nusantara, PLN: Professional Learning Networks, SADAR IGI: Sarasehan Dalam Jaringan Ikatan Guru Indonesia, TPD: Teacher Professional Development, TPLNEQ: Teachers' Professional Learning Network Experiences Questionnaire.

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Author Contributions

Wawan Krismanto: Conceived and designed of research, Collected the data, Wrote the paper, Kamaruddin Hasan: Collected the data, reviewing article, Zaid Zainal: Contributed data, Analysis tools, Abdul Halik: Reviewing article, Conducting validation, Deany Yassir Wirya: Conducting validation, Performed the analysis.

Conflict of Interest

The authors have no conflicts of interest to declare.

Declaration of Artificial Intelligence (AI) Assistance

The authors declare no use of artificial intelligence (AI) for the write-up of the manuscript.

Ethics Approval

The participants in this study were human subjects who were interviewed for this non-interventional study. No clinical trials or experiments were carried out. Before participating in this study, each participant gave written informed consent to be observed and interviewed. However, to protect their privacy, they are only referred to by pseudonyms in publications.

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