Effectiveness of professional learning community programmes to improve school quality

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Abstract

The school is a professional learning community. This study aims to examine the effectiveness of professional learning communities (PLC) in improving the quality of schools. The method used in this research is a mixed method that is carried out in two stages. The correlational method was used to examine the correlation between school quality and the implementation of the PLC programme. Experimental methods are used to examine whether PLC can improve school quality. This study involved 3 secondary schools with an average age of 14–18 years. The results show that there is a high correlation between the level of school quality and the implementation of the PLC programme. In addition, the PLC programme has proven to be effective in improving the quality of schools in terms of teacher competence and student academic results in the fields of language and mathematics. This research provides an overview for stakeholders in schools regarding the importance of collaboration among staff. The implication of this research is that school heads can apply PLC programmes to improve the quality of their schools by prioritising collaborative learning between teaching staff and students.

Keywords: Community of professional learning (PLC), school quality, teacher and students' competence.

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1. Introduction

Currently, every school is competing to carry out innovative programmes in order to improve the quality of their schools in both academic and non-academic aspects. One programme that is currently widely used is the professional learning community (PLC) programme. PLC is a programme that can be used to improve school performance and student academic achievement through learning communities (Cheng & Pan, 2019; Domingo-Segovia et al., 2020). It is believed that PLC can effectively improve and stimulate students' academic abilities by establishing a community or organisation that is able to facilitate more optimal student learning services. Schools have complex tasks; they are not only required to be able to produce quality students but are also required to provide a quality learning process and improve their teaching resources in order to be able to optimally facilitate learning for their students. This complex task is certainly influenced by various factors, such as the school environment and culture. PLC characteristics become the concept that researchers and stakeholders hold for improving the quality of schools (Lin et al., 2018; Liu, 2013).

There are several previous studies that discuss the role of PLC in schools. PLC is proven to be effective in improving the learning process in the classroom because it provides critical, reflective and collaborative discussions between students (Hadianto et al., 2022; Kellner & Attorps, 2020). This component can improve the quality of the learning process and improve student competence in solving problems. In addition, other studies looked at the effectiveness of PLC in improving the competence of teachers. The results show that this PLC can increase the competence of teachers, especially in presenting a quality learning process. By means of a learning community between teachers, PLC is able to make teachers exchange ideas in order to improve the quality of teaching styles and the mastery of subject content (Cheng & Pan, 2019; Hill, 2020). In contrast to previous studies, this study not only looks at the role of PLCs in improving academic abilities or student learning outcomes but also examines the effectiveness of PLCs in improving the quality of PLCs in improving the quality of teachers and other staff. The PLC effectiveness measurement indicator consists of nine components: a) vision and mission that focus on the quality of student learning; b) high targets on student academic competence; c) leadership that involves teachers in decision making; d) recognition and appreciation among staff; e) collaborative learning process; f) community that facilitates the collaboration of teachers; g) work practices that promote collaborative; h) environment that supports collaborative learning; and i) involvement of all components. PLC is one of the programmes adopted by schools, involving various components that are multifaceted (Cheah et al., 2019; Gunning et al., 2020).

The current research focuses on the relationship between the level of school quality and the implementation of the PLC programme in schools and its effectiveness in improving students' academic competence in the fields of Indonesian language and mathematics. This study involved three schools with a total of 13,000 students and 340 teachers and other staff. The average age of students involved in this programme is 14–18 years. The researcher formulated two research questions in this study: a) How is the correlation between school success and its level as a community education? b) How is the effectiveness of PLC in improving students' academic competence in language and mathematics?

2. Literature Review

2.1. School effectiveness and development level

Currently, many researchers, practitioners and stakeholders are thinking of designing various programmes in order to improve the quality of schools and develop their role as professional educational institutions. Schools become educational institutions that are able to make a difference in the development and competence of students, although students' academic achievement is also influenced by factors that come from outside the school, students' initial abilities, culture and the environment in which the school is located. Previous research has proven that there is a strong correlation between students' academic abilities and their parents' level of education (Sandell & Zimmerman, 2017; Shakhsi Dastgahian & Scull, 2021). The correlation has been recognised internationally. Researchers are currently focusing their attention on the impact of the school rather than on the outside of the school. Improving the quality of

schools in general is assessed from the nine aspects previously mentioned, but their effects still need to be deepened. There are several factors that affect the quality of schools including the quality of individuals or data sources, classrooms and the school environment and other factors that do have an impact of different sizes. From previous research on effectiveness, dominated by research examining the effects of the classroom rather than research on the effect of a particular school and comparing it with other schools (Sjoer & Meirink, 2016; Sun-Keung Pang et al., 2016; Tam, 2015).

Variations in the quality of these schools were studied from various countries by taking into account the context attached to the school. Despite the lack of research that raises comparisons of effectiveness between schools, there are similarities in the concept of literature and research, namely the view that teachers are a very important element in improving the quality of schools. The teacher is the main actor in facilitating students to achieve academic and non-academic success. Another study that proves that the school system will be of quality if the teacher is a very decisive aspect in the education system in the school, so that many training programmes focus on improving the quality of the teacher (Wang, 2016; Woolway et al., 2019). In addition, there are still differences of opinion regarding the components that must be assessed by students, whether they are limited to academic competence or more. The quality of students resulting from the education of a school becomes the basis for stakeholders in providing value to the school. In addition, the quality of students is also the basis for improvements in improving the quality of the learning process. The term school improvement is used to describe the role of schools in improving their quality. This school improvement programme focuses on outcomes, competency development, research based, attention to context and school capacity building (You et al., 2018; Zhang & Sun, 2018).

2.2. Programme of PLC

The idea of this PLC programme has been advocated by various educational policies and practices in Indonesia. This idea relates to the development of schools related to professional and organisational learning processes. The PLC programme seeks to create new abilities, knowledge and competencies for teachers and students through organisational development and practices that emphasise collaborative and reflective aspects. This community programme has the ability to develop and improve quality learning processes with the aim of facilitating students to achieve academic success. PLC programmes have five dimensions, including supportive leadership styles, having the main goal of improving the quality of learning, collaborative learning, the learning process taking into account the context of conditions and emphasising practices for quality improvement (Sandell & Zimmerman, 2017; Sun-Keung Pang et al., 2016). Another dimension that is no less important is the reflective dialogue in all elements of the school. PLC programmes consist of various professional groups to achieve common goals, continuously receive new knowledge and competencies through collaborative learning and continuously train their abilities with hands-on practice (Shakhsi Dastgahian & Scull, 2021; Sjoer & Meirink, 2016). It is this component that forms a quality learning process. Each teacher receives new knowledge and competencies and puts them into practice in the classroom. From this experience, teachers will gain experience and a deeper understanding. Teachers carry out this cycle through interaction with other teachers and working collaboratively.

This process is certainly influenced by various factors, including structural components that can hinder or support, a culture of beliefs and values in community groups in the school environment, and mutually supportive leadership styles. These factors are certainly interrelated with each other. In general, this PLC programme has nine characteristics and is at the same time a component of the success of measuring the use of PLC programmes in schools. The nine characteristics of the PLC programme are the main goals of the school focusing on the quality of learning, high targets on student academic achievement, leadership that involves the participation of teachers and other staff, mutually supportive interactions, emphasising collaborative learning processes, organisation that facilitates the intensity of collaboration among teachers, atmosphere work that promotes collaborative, learning processes that emphasise social and collaborative processes, and assessment of staff satisfaction and commitment (Sun-Keung Pang et al., 2016; Tam, 2015; Woolway et al., 2019). The PLC programme has complex components. The success of the PLC programme cannot be seen from one factor but also must be seen from these nine

characteristics. These characteristics give impact and coherence to a common goal. Assessment of the success of implementing the PLC programme should not only measure the outcome aspect but should also measure the process aspect during the implementation of the PLC programme in schools, even though all these components focus on the final results of students' academic abilities (Stevenson et al., 2016; You et al., 2018).

3. Method and Materials

3.1. Participants

The method used in this study is a mixed method involving two types of research methods. This study consisted of two stages; all stages were carried out to test the correlation between the quality level of schools and PLC applied in schools (Table 1). The first stage of this research is to test the correlation between two schools (A and B) by looking at the level of effectiveness of implementing PLC from students' academic competencies, namely the school's national exam scores. The second stage is a research that uses an experimental method to test the PLC programme designed by researchers on the academic competence of students in school C. This research can provide a concept regarding the implementation of the PLC application process in secondary schools.

Table 1

Study Design

Condition	Design	Purpose	Methods
Phase I	Research on two schools with correlational research	Examining the level of effectiveness and its relationship to the features of PLC	Mixed methods
Phase II	One school for experimental study	(1) Testing PLC programme impact on academic competence (2) Learn about the process of implementing PLC	Mixed methods, pre and post data, processing data

In this study, the level of school effectiveness was assessed from the results of the national examination in grade nine and the level of education of parents. As a material for comparison of school effectiveness, the researcher compared two schools A and B as samples in this study. Sample selection was done by using purposive sampling technique. Researchers conducted multiple regression tests on the acquisition of student scores on the results of the national exam in two schools to assess the level of school effectiveness. This national exam score is used as a measuring tool as a result of the influence of school education. In addition, the parental education variable is also used as a consideration. The standardised value is used to see the level of school effectiveness. The components used in data processing using the regression model test are the average value of mathematics subjects ($r = 0.78$, $p < 0.01$) and ninth-grade Indonesian ($r = 0.90$, $p < 0.01$) and parental education level ($r = 0.87$, $p < 0.01$).

Based on the processing results, the independent variable has a significant correlation with the dependent variable. There are factors that must be considered, namely the student scores used must be ensured by the same group of students. In addition to the level of homogeneity of schools from the same cluster, this is a concern for researchers in selecting schools in this research sample. Schools A and B were used by researchers to examine the correlation between the effectiveness of the programme and the implementation of the PLC programme. School C was chosen as the sample to pilot the PLC programme intervention designed by the researcher. This research has obtained permission from the schools involved with a statement of approval from the principal, teaching staff and students. Information about the three schools that were sampled in this study can be seen in Table 2.

Table 2
Information of Three Schools and School Districts in Bandung

Resources	School A	School B	School C	School D
Pupils (approx.)	700	850	500	14,600
Professional staff	60	65	40	1.42
Pupils per teacher	11.5	13	11	12
Other staff	12	21	10	600
Pupils per non-professional staff	53.5	40.1	43	30.2
Pupils per computer	14	13	12	11
Building size (m^2 per student)	10	11.0	7.2	11.1
Schools' lifetime (approx. number of years)	32	12	46	
Satisfaction staff (%)	90	86	101	87
Parents ratio with only required education, survey 2019 (%)	30	40	36	30.2

3.2. Data collection

Researchers used several methods at both stages of the study to collect data, including observation methods and surveys through questionnaires. The method used in the first stage is the interview method and in the second stage the researcher uses participatory observation and analysis of supporting documents. The use of the method, time and participants can be seen in Table 3. In the first stage all the data needed, then in the second stage an analysis of supporting documents was carried out. School staff participants A and B who were involved in this study were asked to fill out a questionnaire with 93% of them filling out the questionnaire. School staff who filled out the questionnaire at school C were 81% at pre-test and 90% at intervention. The questionnaire used in this study contained 60 questions containing nine characteristics of PLC. The questionnaire uses a Likert scale from 1 to 5 points with criteria (strongly disagree–strongly agree). The validity and reliability tests of the questionnaire use empirical tests and expert judgment. The empirical test was carried out by testing it at different schools from the sample, while expert judgment involved five experts with doctoral qualifications. The results of the normality test of the variables in the questionnaire showed that they were normally distributed with a value ($Z = 0.80$, $p = 70$). The level of reliability indicates that the instrument used meets the criteria with an alpha value = 0.95 and a split-half value (Spearman–Brown) = 0.90. The coefficient of alpha value on each variable and the correlation of PLC intervention on school quality are presented in Table 4. The implementation of the PLC programme in an effort to improve schools focuses on four components, including administrative staff, all professional staff involved in improving the quality of learning, efforts to formulate school vision and continuous programme implementation for 1 semester or 6 months. The number of programme implementation meetings is 30 meeting sessions and dialogue observations made by participants during programme implementation. To strengthen the data, interviews were conducted with 20 participants.

Table 3

Data Collection Methods at Each Stage, Applicable Amount and Time

Time	Techniques stage I (schools A and B)	Amount	Techniques stage II (school C)	Amount
April/May 2019	Observations Interviews	16 staff 15 team of workers contributors and Main		
June 2019	Questionnaire survey I	All expert staff, (general 105) 90% reaction rate	Questionnaire survey I	All expert staff, (general 40) Response fee 80%
September 2019–			Participant	12 conferences

November 2020		observations	with administrative team	
		Document analysis	Minutes from 12 crew paintings meetings	
Mei and Juni 2021– April 2022		Non–participant observations	Teachers' stories, from 38 teachers eight staff/crew meetings	
		Questionnaire survey II	All expert staff (general 40), 86% reaction rate	

Table 4

PLC Programme Variables, Alpha Coefficients and Correlation

No	Variables	Alpha	2	3	4	5	6	7	8	9	10
1	Values and vision focus on student learning	0.75	0.80**	0.75**	0.60**	0.60**	0.74**	0.65**	0.35*	0.35*	0.90**
2	Shared leadership	0.82		0.83**	0.70**	0.61**	0.82**	0.70**	0.45**	0.46*	0.90**
3	Supporting each other between staff	0.80			0.76**	0.57**	0.70**	0.66**	0.40**	0.30*	0.91**
4	Collaborative learning	0.65				0.65**	0.72**	0.73**	0.41**	0.42**	0.87**
5	Organisational arrangements	0.56					0.65**	0.60**	0.46**	0.37**	0.75**
6	Work habits support collaboration	0.70						0.73**	0.40**	0.43**	0.88**
7	Social climate	0.60							0.48**	0.37**	0.83**
8	Satisfaction and commitment	0.70								34*	0.57**
9	Student achievement expectations	0.35									0.50**
	Total average score	0.97									

* Significant at 0.01 level; ** Significant at 0.001 level.

3.3. Data analysis

Data analysis was carried out using the Statistical Package for the Social Sciences application with quantitative data results as the main data and strengthened by qualitative data as supporting data. Data analysis was carried out at each school in stage 1, and in stage 2 a programme effectiveness test was carried out using the Kolmogorov–Smirnov test for distribution testing. *T*-test was conducted to compare the average and Pearson's product moment correlation test was performed to see the correlation of the average value with the level of effectiveness. The average value for each variable is summed with the participant's responses obtained from the questionnaire at both stages. The level of the average score indicates the effectiveness of the implementation of the PLC programme. The measurement of the level of school effectiveness is done by dividing the total average score by the score on each variable. The coding

was carried out on observation and interview data, which were adjusted to the nine characteristics of the PLC.

4. Results

Based on the results of the study, it was found that there was a strong correlation between school effectiveness and teachers' views on the PLC programme. The scores showed a significant correlation between teachers' perceptions of school quality and school effectiveness with scores (r = 0.75; p 0.01). There were differences in responses from teachers from schools A and B. Most of the staff's responses to the effectiveness of schools in school A gave responses that assessed that the school was very effective in improving students' academic competence. However, at school B, most of the school staff gave responses indicating a low level of school effectiveness on eight of the nine PLC characteristics. The score at school A was found to be higher on the components of the test and questionnaire regarding the implementation of the PLC programme. Based on the results of the t-test, it was found that the average score was significant on eight variables out of a total of nine PLC components. The less significant variable from the survey results is the expectation of students' academic achievement. Collaborative learning is the PLC factor that has the most significant impact on increasing the average score. Other variables that are less than optimal in giving an impact on the regression test are school vision, teaching habits and job satisfaction. The components of school vision and leadership style have a strong correlation with the level of school effectiveness in facilitating students in improving students' academic achievement. The reinforcing data is supported by the results of the survey responses from staff from schools A and B. Based on the survey results, it was found in school A that the school's vision was clear, focused on students, prioritising discussion in selecting teachers and other officers. However, in school B, it was found that most of the teaching staff and administrative officers viewed the school as not having a clear vision.

Found various activities and activities that prioritise collaborative and structured in both schools. In addition, there were also many formal arrangements. Teachers and other staff prioritise punctuality and collaborate in solving problems. The responses obtained from the questionnaire show that both schools view collective learning as a very important element in improving the quality of their schools. School staff awareness of the importance of collective learning in school A was higher with a score (t95 = 4.50; p = 0.01). This finding is in line with the results of the academic achievement of students who are considered more effective than school B. Another finding regarding teachers' perceptions of the components of the mutually supportive variable shows a significant value (r = 0.61). The significance of the results of the assessment of the PLC component is due to the fact that the social life climate in school A supports collaboration in every element of the school with a score (t96 = 5.30; p = 0.00). These results are reinforced by data from observations and interviews with teaching staff, administration and students. The components of satisfaction and commitment to tasks and work do not show a correlation with the level of school effectiveness. However, most of the teachers in school A gave a response that showed a more significant level of satisfaction than the response from the staff in school B with a score (t97 = 4.45; p = 0.01). From the results of observations and surveys in the two schools, it was found that the learning process prioritised the collaborative learning process by bringing up reflective dialogue and discussion when facing problems. A unique thing is found in school A, namely the teacher involves students to play the role of a teacher for other friends. This collaborative discussion encourages students to deepen their understanding so that academic achievement is more optimal. PLC components that have an impact on school effectiveness can be seen in Table 5.

Table 5

Compare the Mean Scores of School A and School B and the Alpha Coefficients for all Variables

	School	N	Ma	SD	t^h	df
Shared values and imaginative and prescient that target pupil learning	A	50	3.30	0.401	7.70**	90
	B	45	2.61	0.652		
Shared management	A	51	3.20	0.455	5.0**	90

	B	43	2.61	0.652		
Joint support among staff	A	50	3.12	0.361	4.15*	90
	B	45	2.77	0.615		
Collaborative learning to address student needs	A	50	4.01	0.412	3.51*	90
	B	44	3.65	0.406		
Organisational arrangements supporting collaboration	A	52	3.78	0.320	5.12**	90
	B	45	3.64	0.472		
Habits of work supporting collaboration	A	50	4.30	0.528	7.41*	90
	B	45	3.78	0.561		
Social climate	A	51	4.20	0.367	4.30**	90
	B	45	3.82	0.645		
Expectations of student achievement	A	50	3.20	0.512	Ns	
	B	45	4.04	0.721		
Satisfaction with working in the school	A	50	4.02	0.534	3.31*	90
	B	44	4.32	0.712		
Total	A	51	4.20	0.354		
	B	44	3.80	0.504		

Besides being carried out in the learning process, collaborative discussions are also carried out by the teacher. The lecturers discuss teaching styles, content discussions and other teaching strategies with the aim of improving the quality of teaching that can improve the quality of students' academic achievements. In this discussion meeting, teachers evaluate each other with the aim of improving the quality of teaching. However, in this process there were also found colleagues who were less supportive of other teachers. The teacher discusses with other teachers in addition to discussing teaching styles, but also discusses how to manage student attitudes and behaviour and how to get teachers to get respect and sympathy from students. Teachers give each other input about the problem of the learning process. In addition, there are still many characteristics of PLC that are found in school A and not found in school B. One of them is the regular discussions held by each teacher according to the field of study they are teaching and meetings of all teachers. This discussion activity was initiated by the principal at school A.

Next, the researcher further tested the correlation between the levels of effectiveness with PLC in stage 2 as a material for intervention in school C. The measurement of the level of school effectiveness was carried out through a survey. Obtaining the average score before and after the intervention, it was found that teachers' perceptions of PLC were not much different. Not too significant differences were also found in other PLC components with a significance value at the 0.5 level. Although the quantitative data on schools A and B did not show a significant difference, the qualitative data obtained showed an increase in the school vision component, teachers' views on collaborative performance increased significantly. The time used for collaborative activities became more after the intervention. This increase can be seen in the increasing number of opportunities for teachers to improve their quality through collaboration between teachers and through training. After the intervention with the PLC programme, many teachers gave their opinion that they became more open and democratic towards students during the learning process and were more responsible for their choices in using teaching styles. From the student aspect, after the intervention, students became more intensive in solving problems through collaborative discussions both during the learning process and outside the classroom. The increase in PLC components can be seen in Table 6.

Table 6

Mean and Standard Deviation of Variable Pre- and Post-Treatment

Statements	Condition	N	Ma	D_b	SD	pc
Shared values and imaginative and prescient that target pupil learning	Pre	30	4.25		0.452	n.s.

	Post	35	5.41	0.04	0.547	
Shared leadership	Pre	30	4.12		0.492	n.s.
	Post	35	4.125	−0.08	0.491	
Mutual support among staff	Pre	30	3.14		0.612	n.s.
	Post	35	4.02	0.04	0.432	
Collaborative learning to address student needs	Pre	30	3.01		0.412	n.s.
	Post	35	4.12	0.12	0.415	
Organisational arrangements supporting collaboration	Pre	30	3.17		0.618	n.s.
	Post	35	3.46	−0.08	0.523	
Habits of work supporting collaboration	Pre	30	4.12		0.422	<0.05
	Post	35	4.34	0.25	0.451	
Social climate	Pre	30	4.11		0.512	n.s.
	Post	35	4.04	0.03	0.502	
Expectations of student achievement	Pre	30	4.22		0.515	n.s.
	Post	35	4.43	0.13	0.510	
Satisfaction with working in the school	Pre	30	4.26		0.537	n.s
	Post	35	4.54	0.20	0.452	
Total mean score for all variables	Pre	30	4.15	0.07	0.381	n.s.
	Post	35	4.13		0.342	

Table 7
Standard Residuals Over Five Periods of Indonesia and Schools A, B and C

School	Subject	Session 1–5	Session 6–10	Session 11–15	Session 20–25	Session 25–30
School A	Indonesian	1.402	1.332	0.421	0.413	0.086
	Mathematics	0.723	1.034	1.432	1.521	1.316
School B	Indonesian	−1.321	−0.951	−1.314	−0.512	−0.672
	Mathematics	−0.853	−0.612	−0.741	0.432	0.634
School C	Indonesian	−0.943	−0.62	−0.084	−0.343	0.122
	Mathematics	−1.436	−0.922	0.006	0.707	1.618

The effectiveness of PLC in improving academic competence can be seen in school C. The increase occurred during the PLC intervention time, as shown in Table 7. The increase in academic competence can be seen in the value of mathematics and language lessons. Based on the survey results, school C, which became the intervention school, did not find many collaborative activities before the intervention was implemented. There are still many students in school C who depend on their friends because there are still many students who only rely on their friends' work in doing assignments, in contrast to schools A and B. Changes occurred during the implementation of the intervention and after the intervention. Researchers condition students so that they are encouraged to work together in solving problems given by the teacher. More intensive collaborative discussion activities were carried out during the intervention so that they were trained on how to express opinions and were encouraged to think critically because this collaborative discussion process required a high understanding of the subject matter. The PLC programme has proven to be effective in improving students' competence in mathematics and Indonesian at the end of the semester. After the intervention, the students became more challenged to discuss more critical ideas because through the method they were trained to think critically, so that interdependence could be eliminated in class.

5. Discussion

Based on the results of the study, a strong relationship was found between the level of effectiveness and the level of PLC. This study involved three junior high school level schools with an average age of 14–18 years. This correlation study was found in schools A and B which was then further tested for the effectiveness of PLC in school C. A group of teachers implemented the PLC programme and the results can be seen in the improvement of students' academic competence in the field of mathematics and Indonesian. These results are in line with the goal of PLC is to improve the quality of teachers which will have an impact on the learning process and student academic results. Improvements in school quality through the PLC programme can be seen in school activities that are more intensive in holding discussions and collaborative activities among teachers which have a significant effect on the quality of the learning process (Cheng & Pan, 2019; Hadianto et al., 2021b; Kellner & Attorps, 2020). Increased academic ability in the fields of language and mathematics may also be influenced by other factors, but this PLC has proven to be effective in changing learning patterns. This is in line with the positive survey results of teachers' perceptions of PLC. This result is in accordance with the PLC theory which prioritises collaboration in all domains, but the objective of this condition focuses on the main goal, namely increasing student academic achievement (Admiraal et al., 2021; Cheng & Pan, 2019; Domingo-Segovia et al., 2020). Therefore, the main focus that becomes the target of the assessment of the results of the implementation of this programme is the improvement of students' academic competence.

This correlation between PLC and school effectiveness was strengthened by several previous studies that examined the influence of PLC on students' academic competence. In addition, another study looked at the influence of PLC on school vision. PLCs contribute to almost all components of a teacher's job. Strengthening the competence of teachers through the PLC programme is strengthened by previous research which proves that improving the quality of teachers directly affects students' academic abilities compared to the school climate outside the learning process (Admiraal et al., 2021; Friesen & Brown, 2020; Hadianto et al., 2021). From the three schools, the researcher found that there was still little intensity of reflective dialogue carried out by the teaching staff and others. There are several collaborative activities that the researchers found in schools A and B. Among these collaborative activities, there are collaborative activities that are not directly related to students' academic abilities. This is likely to happen and has been strengthened by previous research, namely that there are schools that have a lot of collaborative activities, but have no effect on students' academic competence (Gunning et al., 2020; Park & Byun, 2021; Sandell & Zimmerman, 2017). So, this collaborative discussion in PLC is effective or not depending on the context and purpose of doing it. If this component of collaborative discussion is in a context with the aim of improving the quality of the learning process in schools, it will certainly have a significant impact on students' academic competence, as confirmed by research at school C.

The effectiveness of PLC in improving the quality of schools is in line with several theories which state that collaboration is one way that can be used to improve the quality of schools, especially improving the quality of the learning process. However, in its implementation there are several obstacles, one of which is teacher isolation. Teachers do not know the teaching styles between teachers, so teachers cannot provide suggestions or input that can improve the quality of teaching. This teacher isolation is found in school B, which is proven to have a lower level of effectiveness compared to school A. Leaders in school A are more intensive in conducting collaborative activities that encourage teachers to learn from other teachers about teaching and non-teaching. The reflective dialogue component appears at each of these teacher-to-teacher meetings (Shakhsi Dastgahian & Scull, 2021; Song, 2012; Stevenson et al., 2016). However, it is an important note, teachers do not corner each other's teaching styles and do not violate ethics and decency norms, and still maintain professional values. Activities like this are very useful in increasing skills and expanding knowledge about the learning process.

The condition of interdependence in schools can actually be an opportunity for schools to carry out PLC programmes. This dependency condition can be more useful if it is conditioned on the PLC programme. Individuals, both teachers and students who depend on other individuals who have superior competencies, will be encouraged, motivated and able to take knowledge if directed or conditioned in the right way

(Olivier & Huffman, 2016; Ryoo et al., 2015; Wang, 2016). This PLC programme can be an alternative for stakeholders in improving the ability of individuals who are still dependent on other individuals (Thornton, 2020; Woolway et al., 2019; You et al., 2018). Likewise, the dependence experienced by students. If students who depend on other students are conditioned through the PLC programme properly, these students will certainly experience an increase in competence because they can take a lot of knowledge from collaborative activities and are also encouraged to be actively involved. This is what encourages students who are dependent on them to have the capacity to carry out collaborative discussions.

6. Conclusion, Limitation, and Recommendation

The PLC programme has proven to be effective in improving the quality of schools in terms of the competence of teachers and students' academic results in the fields of language and mathematics. This research provides an overview for stakeholders in schools regarding the importance of collaboration among staff. The PLC programme can be an alternative for school leaders to improve the quality of teachers and academic achievement of students. The implication of this research is that school leaders can implement PLC programmes to improve the quality of their schools by prioritising collaborative learning between teaching staff and students. Based on the research results, the learning styles of teachers and students will be more effective if implemented openly. Teachers can observe other teachers' teaching styles, so they can take good aspects from other teachers in order to improve their quality.

This PLC programme has proven to be effective not only in improving the academic quality of students, but also in improving the quality and climate of the school to become more collaborative. Improving school quality is not only marked by a school climate that prioritises collaboration, but it must also be marked directly by an increase in student academic achievement. The advantages of PLC are the collaborative aspects that are built all focus on improving the academic quality of students. This study has several limitations including the sample of schools involved is still limited to only three schools, does not investigate gender aspects, lacks depth in investigating qualitative aspects and the scope of improvement investigated is still limited. Based on the limitations of the study, the researcher recommends that future research can pay attention to a wider sample by involving schools from various clusters, the investigation variable takes into account the gender aspect, strengthens the qualitative aspect and the domain of the PLC component that becomes the object must be more comprehensive.

7. References

Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers? *Professional Development in Education*, *47*(4), 684–698. https://doi.org/10.1080/19415257.2019.1665573

Cheah, Y. H., Chai, C. S., & Toh, Y. (2019). Traversing the context of professional learning communities: development and implementation of Technological Pedagogical Content Knowledge of a primary science teacher. *Research in Science and Technological Education*, *37*(2), 147–167. https://doi.org/10.1080/02635143.2018.1504765

Cheng, X., & Pan, X. (2019). English language teacher learning in professional learning communities: a case study of a Chinese secondary school. *Professional Development in Education*, *45*(4), 698–712. https://doi.org/10.1080/19415257.2019.1579109

Domingo-Segovia, J., Bolívar-Ruano, R., Rodríguez-Fernández, S., & Bolívar, A. (2020). Professional Learning Community Assessment-Revised (PLCA-R) questionnaire: translation and validation in Spanish context. *Learning Environments Research*, *23*(3), 347–367. https://doi.org/10.1007/s10984-020-09306-1

Friesen, S., & Brown, B. (2020). Teacher leaders: developing collective responsibility through design-based

professional learning. *Teaching Education*, *00*(00), 1–18. https://doi.org/10.1080/10476210.2020.1856805

Gunning, A. M., Marrero, M. E., Hillman, P. C., & Brandon, L. T. (2020). How K-12 Teachers of Science Experience a Vertically Articulated Professional Learning Community. *Journal of Science Teacher Education*, *31*(6), 705–718. https://doi.org/10.1080/1046560X.2020.1758419

Hadianto, D., Damaianti, V. S., Mulyati, Y., & Sastromiharjo, A. (2021a). Enhancing scientific argumentation skill through partnership comprehensive literacy. *Journal of Physics: Conference Series*, *2098*(1). https://doi.org/10.1088/1742-6596/2098/1/012015

Hadianto, D., Damaianti, V. S., Mulyati, Y., & Sastromiharjo, A. (2021b). The role of multimodal text to develop literacy and change social behaviour foreign learner. *International Journal of Instruction*, *14*(4), 85–102. https://doi.org/10.29333/iji.2021.1446a

Hadianto, D., S. Damaianti, V., Mulyati, Y., & Sastromiharjo, A. (2022). Effectiveness of Literacy Teaching Design Integrating Local Culture Discourse and Activities to Enhance Reading Skills. *Cogent Education*, *9*(1), 0–13. https://doi.org/10.1080/2331186X.2021.2016040

Hill, S. (2020). Seeing anew: the role of student leadership in professional learning. *Professional Development in Education*, 563–579. https://doi.org/10.1080/19415257.2020.1787205

Kellner, E., & Attorps, I. (2020). The school–university intersection as a professional learning arena: evaluation of a two-year action research project. *Teacher Development*, *24*(3), 366–383. https://doi.org/10.1080/13664530.2020.1773522

Lin, W., Lee, M., & Riordan, G. (2018). The Role of Teacher Leadership in Professional Learning Community (PLC) in International Baccalaureate (IB) Schools: A Social Network Approach. *Peabody Journal of Education*, *93*(5), 534–550. https://doi.org/10.1080/0161956X.2018.1515833

Liu, S. H. (2013). Teacher professional development for technology integration in a primary school learning community. *Technology, Pedagogy and Education*, *22*(1), 37–54. https://doi.org/10.1080/1475939X.2012.719398

Olivier, D. F., & Huffman, J. B. (2016). Professional learning community process in the United States: conceptualization of the process and district support for schools. *Asia Pacific Journal of Education*, *36*(2), 301–317. https://doi.org/10.1080/02188791.2016.1148856

Park, J. H., & Byun, S. yong. (2021). Principal support, professional learning community, and group-level teacher expectations. *School Effectiveness and School Improvement*, *32*(1), 1–23. https://doi.org/10.1080/09243453.2020.1764061

Ryoo, J., Goode, J., & Margolis, J. (2015). It takes a village: supporting inquiry- and equity-oriented computer science pedagogy through a professional learning community. *Computer Science Education*, *25*(4), 351–370. https://doi.org/10.1080/08993408.2015.1130952

Sandell, R., & Zimmerman, E. (2017). Evaluating a Museum-Based Professional Learning Community as a Model for Art Education Leadership Development. *Studies in Art Education*, *58*(4), 292–311. https://doi.org/10.1080/00393541.2017.1368291

Shakhsi Dastgahian, E., & Scull, J. (2021). Implementing English language teaching reforms through professional learning. *Education Inquiry*, *00*(00), 1–17. https://doi.org/10.1080/20004508.2021.1937865

Sjoer, E., & Meirink, J. (2016). Understanding the complexity of teacher interaction in a teacher professional learning community. *European Journal of Teacher Education*, *39*(1), 110–125. https://doi.org/10.1080/02619768.2014.994058

Song, H. (2012). The role of teachers' professional learning communities in the context of curriculum reform in high schools. *Chinese Education and Society*, *45*(4), 81–95.

https://doi.org/10.2753/CED1061-1932450406

Stevenson, M., Hedberg, J. G., O'Sullivan, K. A., & Howe, C. (2016). Leading learning: the role of school leaders in supporting continuous professional development. *Professional Development in Education*, *42*(5), 818–835. https://doi.org/10.1080/19415257.2015.1114507

Sun-Keung Pang, N., Wang, T., & Lai-Mei Leung, Z. (2016). Educational reforms and the practices of professional learning community in Hong Kong primary schools. *Asia Pacific Journal of Education*, *36*(2), 231–247. https://doi.org/10.1080/02188791.2016.1148852

Tam, A. C. F. (2015). The role of a professional learning community in teacher change: A perspective from beliefs and practices. *Teachers and Teaching: Theory and Practice*, *21*(1), 22–43. https://doi.org/10.1080/13540602.2014.928122

Thornton, K. (2020). Thank goodness it isn't just me–building a learning community for middle leaders. *Journal of Higher Education Policy and Management*, *42*(3), 316–331. https://doi.org/10.1080/1360080X.2020.1739814

Wang, T. (2016). School leadership and professional learning community: case study of two senior high schools in Northeast China. *Asia Pacific Journal of Education*, *36*(2), 202–216. https://doi.org/10.1080/02188791.2016.1148849

Woolway, J., Msimanga, A., & Lelliott, A. (2019). Continuous Collaborative Reflection Sessions in a Professional Learning Community: The Development of Grade 8 Natural Sciences Teachers' Reflective Practice. *African Journal of Research in Mathematics, Science and Technology Education*, *23*(1), 1–13. https://doi.org/10.1080/18117295.2018.1555985

You, J. A., Lee, E. J., Craig, C. J., & Kim, H. S. (2018). Exploring Professional Learning Styles of Beginning Physical Education Teachers in Learning Community. *Asia-Pacific Education Researcher*, *27*(5), 419–429. https://doi.org/10.1007/s40299-018-0402-5

Zhang, J., & Sun, Y. (2018). Development of a conceptual model for understanding professional learning communities in China: a mixed-method study. *Asia Pacific Education Review*, *19*(4), 445–457. https://doi.org/10.1007/s12564-018-9548-3