Effect of Professional Learning Communities on Student Achievement at the Secondary School Level

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Abstract: *The study examined the effect of professional learning communities (PLC) on the achievement of students. PLC is about developing collaborative learning among colleagues to enhance the performance of an organization within a specific environment. Student achievement has defined the performance of students which can be evaluated with the help of tests. Data were gathered from SSTs (N=890) involving three districts (Sheikhupura, Kasur, and Lahore) through a multistage sampling technique. The study adopted the Professional Learning Communities Assessment (PLCA) scale to examine the PLC which was developed by Olivier et al. ([2010](#)). Student achievement scores were obtained from their respective schools based on BISE results of 10th grade. The study found that teachers strongly agreed that they were part of PLC in their institutions. The study also found a moderate and significant relationship between both PLC and student achievement (r=.71), and a 41% variance in student achievement could be explained with the help of PLC. Overall, female teachers were found better than male teachers, while urban teachers were better than urban teachers for being part of PLC. The recommendations were also added to the given study.*

Introduction

A Professional Learning Community (PLC) is a method employed within a specific work environment to enhance collaborative learning among colleagues in which schools organize their teachers into working groups of practice-based professional learning. Peter Senge used this term in the 1990s in his book named *The Fifth Discipline*. Later on, various researchers such as Hord ([1997](#)) and DuFour ([1998](#)) used this term in different contexts. Hord ([1997](#)) stated that PLC is enlarging the classroom practices in the community and community into schools to obtain the learning task and improve the curriculum. It is a great challenge for educators to create PLC in which commitment, expediency, efficiency, and mutual interest can be enhanced through emphasizing shared ideals, relationships, and positive culture which is essential for school

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improvement and student learning (DuFour & Eaker, 1998). PLC through collective teamwork involves multiple characteristics such as shared leadership and responsibility for the quality of education, reflective dialogue and inquiry are encouraged, collective efforts to enhance student learning shared norms and values, and development of feedback and common practices (Stoll et al., 2006). The multiple studies confirmed that through the implementation of PLC, shared values and vision are ensured which leads to a collective commitment of staff members, problems are actively solved, common goals are achieved through teamwork, new ideas and experimentations are encouraged, leaders ensure improvement through professional learning, continuous improvement based on evaluation are ensured, and reflection on actions are implemented (Lomos et al., 2011).

The learning community actually ensures the teaching facilities which further used for their professional development through the teamwork that is most essential for the improvement of a learning community (Murphy & Lick, 2004). Through professional development, teachers make effort to improve their teaching skills of each other and share multiple techniques of teaching to develop an effective learning community. The previous research also confirmed that through interaction, collaboration, and integration of daily practices, teachers grow more professionally and become more effective teachers (Van Veen et al., 2012). For the better development of learning communities, ensures student learning in which head teachers and teachers work together through shifting the focus on the learning instead of teaching, focus on the culture of mutual collaboration in which both teachers and head teachers generate the system of collaboration for the learning community, focus on expected results in which improvement and better results of students are ensured through teamwork within the institution (DuFour, 2004).

Olivier et al. (2010) gave the main dimensions of Professional learning communities in their study. First, *shared leadership* is in which all stakeholders are involved to share important concerns, develop relationships to improve student outcomes, and take mutual responsibility and decision-making (Wu et al., 2020). Second, *target oriented* in which all PLCs are involved to implement and analyze the instructional practices

and common assessment to enhance student achievement (DuFour, 2004). Third, in PLC, *collaborations* are ensured to solve problems and provide learning opportunities through which new knowledge and skills are utilized for the school's effectiveness, produce the best solutions to the problems, develop a good relationship between teachers and heads of institutions, and enhance the student outcomes (Donohoo et al., 2020; Tschannen-Moran & Barr, 2004). Fourth, through *sharing best personal practices* by teachers, develop effective collaboration in their daily work life, provide help, support and trust each other, respect mutually, praise and recognize the achievement of others, and provide support to solve the issues for better student outcomes (Othman et al., 2019). Fifth, PLC develops such a structure which involves different conditions such as school size, the closeness of staff members, effective communication systems, and meetings with staff to examine the current practices to maximize student achievement (Burns et al., 2018). Sixth, PLC ensures *the condition of collegial relationships* which involves trust, respect, norms of critical inquiry and improvement, and good relationships among all stakeholders (Patrick, 2013).

The multiple studies confirmed that both PLC and student achievement were correlated with each other. Louis and Marks (1998) revealed in their study that students performed better where collaboration among all stakeholders was implemented. A similar result was also found by Supovitz and Christman (2003) that work through the collaboration of teachers and student achievement was associated with each other. Burns et al. (2018) conducted a study to examine the effect of PLC on student outcomes and found similar results in their study. There were also various studies that revealed a positive relationship between both PLC and student achievement (Goddard et al., 2007; Hurley et al., 2018; Lomos et at., 2011; Othman et al., 2019; Park et al., 2019; Patrick, 2013; Ratts et al., 2015; Rosado, 2019; Vogel, 2012).

In Pakistan, teachers have been found to work in groups, collaborate with each other, and learn from each other on various aspects of teaching such as pedagogical skills, knowledge of the subject matter, assessment methods, classroom management strategies, improving communication and interaction with all

stakeholder of the community and so forth. Little has been found in terms of the use of PLC and its relationship with student achievement. Further, no study, perhaps, compared teachers' scores on PLCs based on their gender (male and female), and school location (rural and urban). It will be important to know whether male or female teachers and rural or urban teachers organize better professional learning communities. The researcher expects that this study might be useful for teachers to improve the role of learning communities to maximise their involvement in student outcomes and school improvement.
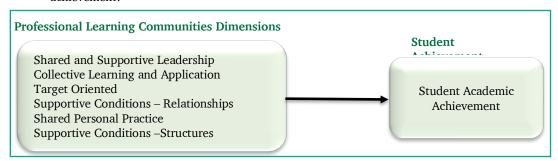
Research Questions

The study includes the following research questions:

1. What does SST perceive of the dimensions of PLC?
2. What is the relationship between dimensions of PLC and student academic achievement?
3. Do dimensions of PLC combine to predict student academic achievement?
4. Is there a significant difference between perceptions of male and female teachers on dimensions of PLC?
5. Is there a significant difference between the perceptions of teachers of rural and urban high schools on dimensions of PLC?

Conceptual Framework

A conceptual framework is a visual description of the variables (Professional Learning Communities (PLC) and Student achievement) and their possible interrelationships. The study at hand involved PLC which was measured through the following factors, while student achievement scores were examined through the BISE annual results of the 10th class. Based on the provided framework, it was assumed that PLC would predict correlate and predict student achievement.

Professional Learning Communities Dimensions

Shared and Supportive Leadership
Collective Learning and Application
Target Oriented
Supportive Conditions – Relationships
Shared Personal Practice
Supportive Conditions –Structures

Student Achievement

Student Academic Achievement

Review of the Related Literature

Effect of Professional Learning Communities on Student Achievement

Othman et al. ([2019](#)) examined the professional learning communities (PLC) towards student achievement by using content analysis for data collection. The study provided five main factors of professional learning communities such as shared practices, reflective dialogue, focus on students through collaboration, mutual norms, and collaboration. Through this study, the best model was introduced to evaluate the PLC which further enhances student achievement. The study suggested that by implementing this model of PLC, student achievement can be maximized in institutions. In another study, the relationship between PLC and student outcome were examined by Vogel ([2012](#)) by gathering data from

teachers with the help of a questionnaire and student outcomes score. The study revealed a significant and moderate relationship between both variables. The study recommended that student achievement can be improved by implementing professional learning communities.

Lomos et al. ([2011](#)) investigated the association between PLC with student outcomes by using meta-analysis. The study found that student achievement could be explained through the PLC. The implementation of PLC was recommended to maximize student achievement. Burns et al. ([2018](#)) also conducted a study to measure the effect of PLC on student achievement in Missouri State, USA. The study comprised 181 schools with an average of 428 students per school. The findings of the study revealed that PLC attributed significantly correlated with student outcomes in mathematics. Similarly, in

another study, DiNardo (2010) examined the effect of PLC on student outcomes by using a qualitative approach to collect the data. The study also revealed that both PLC and student outcomes were correlated which confirmed the essentiality of PLC for enhancing student learning and school effectiveness.

Rosado (2019) also examined the effect of PLC on student achievement by employing a mixed-method research design. The study determined some main components of PLC such as collaboration, communication, development of teachers, and teaching and learning which correlated and predicted student outcomes. In a similar way, Hunter-Boyce (2009) also investigated the association between both professional communities of learning and student outcomes. Both qualitative and quantitative data were used in this mixed study design and revealed both variables are highly associated and student outcomes could be predicted through PLC. The study recommended using this model of PLC to maximize student performance.

Siguroardottir (2010) provided nine factors of PLC and examined the relationship with school effectiveness and found the association between both variables which confirmed the significance of PLC for school effectiveness and school development. In another study, Hurley et al. (2018) also investigated the association between PLC and student outcomes by collecting data from teachers and students. The study found that PLC and student achievement were correlated but did not predict student achievement through PLC. However, the study found different results to some extent but confirmed the association between both these variables. Patrick (2013) also investigated the association between both PLC and student outcomes and revealed a significant relationship between both these variables. The study suggested the effective implementation of the PLC model to improve the quality of education.

Ozkan (2016) also examined the effect of PLC on student outcomes. The study found that student achievement could be predicted through the effective implementations of PLCs and both these variables are also moderately correlated with each other. To maximize the learning of students, the PLC framework was suggested for implementation in the institutions. Similarly, Peters (2013) conducted a study to measure the

association of PLC the student achievement by using a mixed-method approach for the collection of data. The study also revealed similar findings that PLC was correlated and student outcomes can be predicted through PLCs which confirmed the significance of PLC for student learning and school improvement.

Moreover, Jacobs (2010) also measured the association of PLCs the student outcomes by adopting a quantitative approach to data collection. The study determined the factors of PLCs such as learning, collaborative culture, instructional strategies, common formative assessment, overall impact, and support and allocation that were correlated and predicted student achievement. The study recommended implementing this model of PLCs to enhance the competence of teachers, school effectiveness and student achievement. In another study, Croasmun (2007) conducted a study to measure the effect of PLC on student achievement by taking five factors of PLC: shared vision and values, shared and supportive leadership, creativity, supportive condition, and shared practices. A mix-method approach was used to collect the data involving questionnaires, interviews, observations, and documents. The study revealed that both student achievement and PLC were correlated and PLC was the predictor for student outcomes which confirmed also the essentiality of PLC for student learning.

Overall, the previous multiple studies which measured the professional learning communities through involving the quality factors confirmed that the effective PLC framework is required to enhance the capacity of teachers to perform their role effectively within institutions, maximize the school effectiveness through utilizing the resources effectively which is essential for the school progression, and improve the student learning through providing the supportive and encouraging environment. In Pakistan, there might be no study which actually provided an effective framework which can be further implemented in the schools to obtain the maximum level of results from institutions in terms of a supportive environment, school development, teacher effectiveness, and most important student achievement. The study at hand measured the effect of PLCs on student achievement which might be helpful to understand the importance of PLC for student

outcomes and fulfilling the prevailing gap in the literature.

Methodology

A survey method was used in this correlational study. From all the districts of the province of Punjab, three districts (Sheikhupura, Kasur, and Lahore) were selected randomly by employing a multistage sampling technique and among them, 890 SSTs were selected as a sample of the study. The study involved in overall 440 (49%) male and 450 (51%) female teachers. The study adopted the Professional Learning Communities Assessment (PLCA) questionnaire which was

developed by Olivier and Huffman ([2010](#)). This scale consisted of 52 items having six dimensions with a four-point Likert scale (Strongly Agree=4, Agree=3, Disagree=2, Strongly Disagree=1). The instrument was pilot tested on 30 secondary school teachers in district Sahiwal and was found to be reliable (α=.78). Later on, the questionnaire was distributed to 936 teachers, while 890 teachers responded; the overall response rate was 95%. All ethical concerns such as informed consent and data confidentially were addressed properly. The data were analyzed after cleaning. The following table shows the reliability of the data.

Table 1

Demographics-Frequencies

Variables	Levels	[*n* (%)]
Gender	Male	440 (49.43)
	Female	450 (50.57)
	Total	890 (100.00)
School Location	Rural	510 (57.30)
	Urban	380 (42.69)
	Total	890 (100.00)

The study included 440 (49.43%) male and 450 (50.57%) female teachers; location-based demographics showed that 510 (57.30%) rural and 380 (42.69%) teachers were teaching in urban schools.

Table 2

Reliability of the Scale---------Factor-Wise and Overall

Scales	Items	α
Shared and Supportive Leadership	1-11	.81
Target Oriented	12-20	.81
Collective Learning and Application	21-30	.75
Shared Personal Practice	31-37	.78
Supportive Conditions – Relationships	38-42	.82
Supportive Conditions- Structures	43-52	.88
Overall Reliability	1-52	.85

Initially, factor-wise and overall reliabilities of the scale were calculated by using Cronbach Alpha.

Table 3

Descriptive Statistics------------Professional Learning Communities (N=890)

	Min	Max	Mean	S.D.
Shared and Supportive leadership	11.00	44.00	33.34	2.540
Target Oriented	09.00	36.00	25.24	2.288
Collective Learning and Application	10.00	40.00	30.26	3.980
Shared Personal Practice	07.00	28.00	22.56	3.344
Supportive Conditions-Relationships	05.00	20.00	16.24	2.322
Supportive Conditions-Structures	10.00	40.00	32.16	2.634
Overall	66.00	196.00	168.38	12.234

The highest mean score was found for the dimension *Shared and Supportive leadership* (M=33.34, SD=2.540), followed by *Supportive Condition* (M-32.16, SD=2.634) and *Collective Learning and Application* (M=30.26, SD=3.980). The minimum mean score was found for the dimension *Supportive Conditions-Relationships* (M=16.24, SD=2.322). Overall, according to the table, the mean score for all dimensions showed that the teachers strongly agreed that they exercised these dimensions in their schools and constituted professional learning communities.

Table 4

Relationship between Professional Learning Communities (PLC) and Student Achievement

Factors	Pearson (r)
Shared and Supportive Leadership	.54*
Target Oriented	.61*
Collective Learning and Application	.63*
Shared Personal Practice	.56*
Supportive Conditions – Relationships	.65*
Supportive Conditions- Structures	.64*
Overall Relationship	.71*

Pearson r was calculated to measure the relationship between dimensions of PLC and student achievement in the Board of Intermediate and Secondary School exams of 10th graders in the 2019 annual exam. The results showed that significant positive moderate relationship between all dimensions of PLC and student achievement—from .54 to .65—with the overall relationship of .71 as a strong positive correlation.

Table 5

Multiple Regression Analysis: Predicting Student Achievement through Dimensions of Professional Communities

Model	Sum of Square	df	Mean Square	F	Sig.
Regression	224.980	6	37.488	83.374	.000
Residual	221.670	884	450.00		
Total	446.598	890			

Six dimensions of Professional learning communities significantly combined to predict student achievement (R^2=.51, $F(6, 890)$=83.376, p=.000). R square value revealed that a 51 per cent variance in student achievement was explained through six dimensions of professional learning communities. All six factors, individually, significantly predicted student achievement as Shared and Supportive Leadership (β=.050, p<.003), Target Oriented (β=.074, p<.002), Collective Learning and Application (β=.080, p<.005), Shared Personal Practice (β=.089, p<.007), Supportive Conditions – Relationships (β=.146, p<.003) and Supportive Conditions-Structures (β=.089, p<.007).

Table 6

Comparison of Professional Learning Communities Based on Teacher Gender

Dimensions	Gender	N	M	SD	t	df	Sig
Shared and Supportive Leadership	Male	440	32.64	2.333	1.523	888	.002*
	Female	450	34.52	2.148			
Target Oriented	Male	440	27.23	2.450	-.433	888	.003*
	Female	450	28.91	2.145			
Collective Learning and Application	Male	440	30.24	5.313	-.358	888	.001*
	Female	450	32.82	5.154			

Dimensions	Gender	N	M	SD	t	df	Sig
Shared Personal Practice	Male	440	18.55	3.822	-.720	888	.000*
	Female	450	19.44	3.280			
Supportive Conditions-Relationships	Male	440	15.38	2.953	1.280	888	.000*
	Female	450	16.22	2.497			
Supportive Conditions-Structure	Male	440	32.78	5.650	-.890	888	.000*
	Female	450	33.07	5.472			
Overall	Male	440	174.09	12.040	-.980	888	.001*
	Female	450	184.40	11.456			

(2-tailed Sig.)*

Table 6 showed the significant difference between male and female teachers' perceptions regarding dimensions of PLC in their schools, and female teachers rated PLC better than male teachers rated: *Shared and Supportive Leadership,* $t(888)=1.523$, p=.002, *target orientation,* $t(888)=-.433$, p=.003, *Collective Learning and Application,* $t(888)=-.358$, p=.001, *shared personal practice,* $t(888)=-.720$, p=.000, *supportive conditions – relationships,* $t(888)=1.280$, p=.000, *supportive conditions – structures,* $t(888)=-.890$, p=.000. In overall, female teachers showed a higher level of score than a male teachers for implementing the PLC, $t(888)=-.980$, p=.000.

Table 7

Comparison of Professional Learning Communities Based on School Location

Dimensions	Location	N	M	SD	t	df	Sig
Shared and Supportive Leadership	Rural	510	35.34	3.233	1.450	888	.000*
	Urban	380	34.66	3.444			
Target Oriented	Rural	510	29.26	3.490	1.890	888	.000*
	Urban	380	28.67	3.787			
Collective Learning and Application	Rural	510	33.55	4.333	-.576	888	.000*
	Urban	380	32.60	4.190			
Shared Personal Practice	Rural	510	23.60	3.786	-.982	888	.000*
	Urban	510	22.62	4.660			
Supportive Conditions-Relationships	Rural	380	17.24	4.343	1.230	888	.000*
	Urban	510	15.78	4.230			
Supportive Conditions-Structure	Rural	380	33.75	4.902	-.774	888	.000*
	Urban	510	32.40	4.897			
Overall	Rural	380	165.10	13.494	1.870	888	.000*
	Urban	510	172.44	12.460			

(2-tailed Sig.)*

According to Table 7, there were significant differences between urban and rural teachers' perceptions of all dimensions of PLC, i.e. *Shared and Supportive Leadership* (rural, M=35.34, S.D.=3.233, urban, M=34.66, S.D.=3.444), *Target Oriented* (rural, M=29.26, S.D.=3.490, urban, M=28.67, S.D.=3.787), *Collective Learning and Application* (rural, M=33.55, S.D.=4.333. urban, M=32.60, S.D.=4.190), *Shared Personal Practice* (rural, M=23.60, S.D.=3.786, urban, M=22.62, S.D.=4.550), *Supportive Conditions-Relationships* (rural, M=17.24, S.D.=4.343, urban, M=15.78, S.D.=4.230), and *Supportive Conditions-Structure* (rural, M=33.75, S.D.=4.902, urban, M=32.40, S.D.=4.897. On all factor-wise comparisons, urban teachers perceived a higher level of involvement in PLC than rural teachers. Overall, urban teachers significantly differed on dimensions of professional learning communities (M=172.44, S.D.=12.460) than rural teachers (M=165.10, S.D.=13.495), $t(888)=1.870$, p=.000.

Discussion

The study was conducted to find out the perceptions of secondary school teachers about the dimensions of PLC and to see the relationship of PLC with students' academic achievement. The findings of the study revealed that teachers of secondary schools used to work in PLC and think that it is productive for their professional learning and development. The study at hand further revealed a strong relationship between PLC and student achievement (r=.71) that were in line with various studies (Burn et al., 2018; Croasmun, 2007; DiNardo, 2010; Hurley et al., 2018; Hunter-Boyce et al., 2009; Jacobs, 2010; Othman et al., 2019; Patrick, 2013; Siguroardottir, 2010; Vogel, 2012) which confirmed that professional learning communities measured through quality factors are essential for the student achievement. Further, the study also explored that 41% variance in student achievement could be explained through the professional learning communities that were also consistent with multiple studies (Burns et al., 2018; Hunter-Boyce et al., 2009; Jacobs, 2010; Lomos et al., 2011; Peters, 2013; Ozkan, 2016) confirmed that professional learning mainly contributed in the student achievement. The study also revealed that female teachers were better than male teachers in implementing the PLC, while urban teachers were better than rural teachers in implementing the PLC in their institutions. Overall, the results of the study based on PLCA confirmed previous theories, models, and findings that professional learning communities measured through the quality framework were correlated with student outcomes and also the predictor of student achievement.

Othman et al. (2019) evaluated the professional learning communities (PLC) through quality factors such as shared practices, reflective dialogue, collective focus on learning, mutual norms, and collaboration that were correlated and predicted student achievement. In another study, Vogel (2012) also explored the similar result that PLC and student achievement were correlated with each other. Lomos et al. (2011) also confirmed that PLC is the predictor of student outcomes. Burn et al. (2018) also provided evidence that student achievement could be explained through PLC. DiNardo (2010) used the qualitative approach and the results also confirmed that both variables are correlated with

each other. The given studies were in line with the study at hand that further endorsed the idea that PLC is the main factor for student outcomes.

Similarly, Jacobs (2010) also confirmed through his valuable study that PLC was evaluated by using factors; learning, collaborative culture, instructional strategies, common formative assessment, overall impact, and support and allocation that were correlated and predicted student achievement. Patrick (2013) also provided evidence that both PLC and student achievement are highly correlated with each other. Rosado (2019) also revealed that PLC based on quality factors: collaboration, communication, professional development, and teaching and learning predicted student outcomes. There are some other studies that also revealed similar results and were also consistent with the study at hand (Croasmun, 2007; Hurley et al., 2018; Ozkan, 2016; Siguroardottir, 2010). Overall, Professional learning communities were found most essential and contributing factor to enhancing the quality of education, and development of teachers and student learning which maximizes the overall school effectiveness and improvement.

Conclusion

The study mainly focused to find out the effect of PLC on student achievement at the secondary level. The study found that schools implemented the PLC framework effectively based on quality factors. The study further also revealed the relationship between PLC and student achievement, while a 41% variance in student achievement could be explained through the professional learning communities. Furthermore, gender-based and school location-based differences in implementing the PLC were measured, and female teachers were found better at implementing the PLC as compared to male teachers, while urban teachers were better than rural teachers at implementing the PLC in their institutions.

Recommendations

1. The study found that dimensions of professional learning communities significantly predicted student achievement; it is recommended, therefore, professional learning

communities may be focused on by the teachers and head teachers in all secondary school teachers. The results may lead to the conduct of causal relationship studies in future.

2. The study found that male teachers demonstrated a low level of PLC in their institutions. It is, therefore, recommended that school and district-level administration should take measures to improve community development in male schools. Pieces of training or short courses for maximizing teachers' involvement and developing learning communities may be arranged for male teachers in high schools.

3. The study found that rural teachers demonstrated a low level of PLC as compared to urban school teachers. It is, therefore, recommended that rural school leaders should encourage teachers to be involved in learning communities.

4. Further studies may be conducted with a larger sample size so that generalizations may be made more clearly. The findings based on this study involve a limited sample size taken from only 3 districts due to time constraints. The results of this study, therefore, might not be generalized over all the schools of the province of Punjab.

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