

Article

District Office Leadership Supporting Site-Level Teacher Collaborative Teams

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Abstract: Previous researchers examining professional learning communities (PLCs) claim that effective building-level PLCs improve teacher collaboration and student achievement. However, the role of district office leadership in supporting the success of site-level PLC teams is presently underexplored. Using an online survey, we investigated the claim that district office support enhances the success of site-level PLCs. Quantitative data were collected from 596 participants employed at 21 schools within 16 school districts in the north Texas region. Findings derived from correlation and structural equation modeling analyses revealed a significant direct effect of district office leadership support on successful PLC team implementation, suggesting that district leaders play an active role in the districtwide implementation of PLCs.

Keywords: school leadership; collaboration; district office support; school reform

1. Introduction

Whole system reform focusing on a school district's capacity to move its students toward progressively higher levels of achievement continues to command attention from educational leaders around the globe [1]. While the metrics for the optimization of human and operational capital vary between public and private sectors, Ref. [1] defined organizational capacity as all conditions that enable an organization to function effectively and achieve its goals. Regarding school districts, Ref. [2] specifically noted that instructional leadership is a key condition supporting improved student learning outcomes. Optimal use of organizational capacity for schools includes the active role of district gatekeepers in allocating school resources and the actions and processes that enable teachers to improve classroom practices, leading to higher levels of student performance. Highly effective levels of organizational support facilitate school personnel with key resources, including qualified teachers and leaders empowered to access external organizations [3] and data needed for effective school improvement planning [4]. Other indicators of systemic success include high levels of job satisfaction that lead to teacher retention and increased levels of organizational intelligence [5].

High organizational capacity for districts and schools, however, is typically encumbered by policies and practices that govern traditional operations. Ref. [6], for example, identified punitive accountability, individualistic strategies, technology, and ad hoc policies as key inefficiencies, or “wrong drivers”, that typically impede coherent district application of four “right drivers”, including capacity building, collaboration, pedagogy, and coordinated policies. Such operational boundaries impede fluid, flexible access to internal and external resources that teachers and administrators need, creating barriers that isolate schools from the effectiveness their districts envision. Ref. [7] further noted that changing demographics among organizational stakeholders also affect decision-making processes for district leaders. Effective professional learning communities (PLCs) are instrumental in helping navigate such boundaries, changing the beliefs and practices of teachers and leaders to



Citation: Voelkel, R.H., Jr.; Johnson, C.W.; Nadeem, F. District Office Leadership Supporting Site-Level Teacher Collaborative Teams. *Educ. Sci.* **2023**, *13*, 1092. <https://doi.org/10.3390/educsci13111092>

Academic Editor: Youmin Xi

Received: 25 August 2023

Revised: 18 September 2023

Accepted: 26 October 2023

Published: 28 October 2023



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support them in their professional endeavors [8]. In addition to their effectiveness as a school-based reform model, PLCs can ensure the sustainability of initiatives intended for school improvement [9,10]. While there are multiple definitions of professional learning communities [11], we use the definition offered by [12]. They define PLCs as “a school organization in which a group of teachers share and question their practice from a critical point of view. This questioning happens in an ongoing, reflective, collaborative, and inclusive way” ([12], p. 32). This definition was used in our study because it concisely captures the PLC teams’ work in the case study districts.

A sound body of research supports that leadership is key in implementing and sustaining PLCs [13]; however, the role of the district in ensuring PLC success is less clear. While evidence suggests that school district involvement is needed, there is limited research on the impact of district-level support on the success of school PLC team implementation and sustainment. This study expands the understanding of the district’s role in supporting a school-level reform effort, such as a PLC, through surveys of 596 teachers in 21 schools in 16 districts across the north Texas region.

2. Literature Review

2.1. Professional Learning Communities

During the late 20th century, PLCs emerged as a promising practice to create an environment for teachers that could strengthen and support a collaborative school culture. Over the following decades, a sound body of research focusing primarily on PLC implementation at the school level clearly established the effectiveness of PLCs. Early studies centered on changing teacher behavior, reducing traditional workplace isolation, increasing opportunities for teacher development, and other areas of teacher efficacy for improving student achievement outcomes [14,15]. As PLCs evolved, studies contributed to school improvement frameworks for PLC implementation, including Hord’s [16] five discrete dimensions of teacher behavior that affect a cultural shift in PLCs toward collaborative decision-making. Hord’s model guides PLCs in building areas of practice essential to high-functioning teams, including (a) Supportive and Shared Leadership, (b) Shared Values and Vision, (c) Collective Learning and Application of Learning, (d) Supportive Conditions, and (e) Shared Practice. Studies have built upon earlier works to further explore the benefits of PLCs in strengthening collegiality, trust, and commitment while building teachers’ knowledge, skills, and dispositions [17]. A developing body of research is presently considering PLCs from the added dimension of systemic optimization. Areas of focus include district initiatives designed to support PLC success [18], institutional partnerships supporting PLCs and student learning [19], and the resistance or inability to adapt to change [20].

Ongoing research supports the mutually dependent relationship between successful PLCs and the principals leading their work [13]. Ref. [21] suggested that PLCs need school leaders who provide supportive and shared leadership structures for teachers. In a study on successful PLCs, Ref. [22] found strong evidence that high-functioning PLC teams felt they were supported by the principal. Ref. [23] studied teachers and principals from 67 southeastern U.S. schools, finding that collegial trust, an academic emphasis, and the enablement of school structures serve as key prerequisites for the development of successful PLCs. Additional studies have established that teachers and school leaders should work collaboratively to design and develop the PLC structure, an important first step in building trust that supports a culture of learning for continuous improvement and higher student achievement outcomes [10,21].

While the literature is clear that leadership is foundational to PLC success, it also points to numerous challenges that PLCs and leaders face in developing high-functioning teams. Many of these challenges are deeply embedded in school culture and tradition [24]. Tayag [24] noted four discrete areas of cultural challenge for teachers associated with PLC implementation: obligation overloads or time conflicts, low trust toward faculty, conflicts with ranking and promotion schemes, and lack of appreciation for the benefits gained from PLC participation. According to [25], additional challenges to PLC implementation

can arise from a change in group dynamics resulting from leader or teacher turnover; perceptions of task inequity among teachers; collective ownership of the PLC activities; and work tensions due to time constraints, high work pressure, and stress. Other factors include a lack of protected time for collaboration, ineffective school leadership, and unsupportive accountability policies, which are, according to [26], catalysts in creating barriers to successful PLC implementation. Zhang and Pang further noted that financial constraints, teachers' passive attitudes, lack of trust, and shortages of external resources present additional challenges for administrators responsible for supporting PLCs.

Over several decades, studies linking district support to school improvement and student achievement outcomes have been lacking [27]. A deeper understanding of the relationship between district support for successful PLCs is essential to planning and implementing improvements that leads to student success.

2.2. School and District Leadership: The Disconnect

High-functioning districts provide a coherent structure that supports schools with the grounded alignment of monitored goals and targets, meaningful feedback, and a culture of job-embedded accountability [28]. While a broad research base contributes significantly to what we know about district leadership as foundational to improving teaching and learning in schools and districts [29], the literature has yet to directly link the role of district support to the success of teacher PLC teams. Early research suggests, however, that there is much to be gained from a close examination of the district as an institution and the work of teachers and the PLC process. District support is essential to the day-to-day operations of teachers and PLCs as they lack the physical conditions or human capital required to implement large scale change in its absence [30]. The district serves schools as a model for effective professional practices [31] and adopts and implements policy, facilitates community relationships, and creates other conditions for organizational capacity [32]. Districts also control logistical assets that can be barriers to teachers and PLC operations, including the allocation of time, capital resources, and budget considerations affecting the conditions under which PLCs may meet [33].

Thessin and Starr [34] noted that district leadership provides essential support for PLCs within four discrete domains: (a) teacher and principal involvement in developing and leading PLCs, (b) ongoing professional development, (c) clearly articulated improvement processes, and (d) differentiated support in meeting school needs. While the essentiality of district support for teachers is loosely woven throughout the literature, current studies point mainly to the influence of principals as the immediate source of support for teachers and PLCs [22]. An international study examined how successful educational leadership at the school, district, and state levels influences teaching and learning; for example, Ref. [35] found that principals exercised great influence in supporting reading teachers with implementing new instructional policies, whereas the role of the district was directed primarily toward principal support. Conversely, while exploring districts where there was evidence of strong PLC support, Ref. [36] found that an overall increase in teacher leadership enhanced collaboration for student learning, strengthened morale, and encouraged data-driven decision-making. The literature further notes that the delivery of high-quality professional learning is a strength for supporting teachers in many districts. While districts dedicate generous amounts of time and resources toward offering a wide range of formal learning for teachers, the process is typically structured for the delivery of information rather than collaboration [37,38]. Though numerous studies confirm that district support is key, few address the need for a clearly articulated framework connecting the role of the district directly to the work of teachers and PLCs [37].

2.3. District Leadership and Perceived Organizational Support

Historically, research rooted in institutional theory has argued that schools tend to distance themselves in response to pressures associated with district-driven change, an act that [37] defined as "decoupling" (p. 212). Following the adoption of a new policy,

for example, district leaders are responsible for communicating a call to action for implementing the unfamiliar initiatives, creating a sense of urgency for priority response from teachers [13]. In turn, teachers react to policy-driven change by applying what Coburn described as “bounded autonomy” ([39], p. 235), interpreting the meaning of new policy to construct a response that makes sense for application within the context of the teachers’ own classrooms. Coburn further suggested that teachers deconstruct and synthesize new policy and its meaning based on preexisting beliefs and practices influenced by their past experiences with institutional pressures. Thus, teacher perceptions of a new policy, its interpretation, and its application within the construct of their bounded autonomy determine the degree and fidelity of policy implementation when the classroom door is closed.

Organizational theorists note that employees who perceive they are strongly supported by their leaders within a generally facilitative organizational climate, a condition that [39] designated as perceived organizational support (POS), are more likely to reciprocate public actions and opinions that advance the interests of the organization [40]. In their study of 361 public and private sector employees, Ref. [39] found that high levels of POS resulted in reduced absenteeism, higher productivity, and a greater likelihood of employee retention. Upon further exploration of employee POS, Ref. [41] noted that while capital resources such as money, services, and information are fundamental assets distributed to garner employee support, more personal means of support, such as approval, recognition, and respect, also drive positive reciprocal social exchange within an organization [42]. These outcomes further suggest that perceptions of district-level support may positively influence the success of school-based PLCs.

3. Conceptual Framework

The conceptual framework that guided this study was developed based on five dimensions for successful PLCs as identified by [43]. Hord’s model for successful PLCs included (a) Shared and Supported Leadership, (b) Shared Values and Vision, (c) Collaborative Learning and Application, (d) Shared Personal Practices, and (e) Supported Conditions. We also assessed one district office factor that examined how teachers perceived support from organizational leaders.

Research Question

Using Pearson’s r correlation and structural equation modeling, this study addresses the following research question:

To what extent does district leadership support affect PLCs at the school level within each dimension of Hord’s five attributes of effective PLCs?

4. Methods

This quantitative study drew on data collected between fall 2019 and fall 2020 from teachers at various school districts in north Texas to examine the claim that district office support enhances teachers’ perceptions of high levels of PLC implementation. For this study, we investigated district office leadership efforts to build the capacity of PLC teams and assessed the impact of those efforts to improve the five PLC dimensions described by [43]. District support was the independent variable, and PLC dimensions (Shared and Supported Leadership, Shared Values and Vision, Collaborative Learning and Application, Shared Personal Practices, and Supported Conditions) were dependent variables. The quantitative results gained from 596 participants revealed high PLC mean scores (average mean = 3.86 on a 5-point scale) and district office leadership scores (average mean = 3.68 on a 5-point scale).

4.1. Context of the Study

There were 16 school districts serving students in grades K-12 throughout north Texas that participated in this study. The districts span approximately 1335 square miles and include main cities, communities, and rural, suburban, and urban areas. At the time of

this study, the north Texas area was home to the fastest-growing populated regions in America and had long been recognized as a low-cost, low-tax, and high-quality business environment. The 16 study districts served approximately 498,000 students from diverse ethnic backgrounds, including Hispanic (44%), White (26%), African American (16.6%), and Asian (8.5%). The student population among participating districts was also highly diverse, including learners categorized as bilingual/ESL (31%), low socioeconomic status (SES) (45%), students with special needs (9.5%), and other student groups designated as academically at risk (46%). Students attended 442 elementary schools, 129 middle schools, 101 high schools, and 35 other centers within the districts. Using non-probability convenience sampling methods, 25 school and district leaders enrolled in dissertation courses as part of an educational leadership doctoral degree in Texas were invited to distribute the survey to their teachers. Participation in our study was completely voluntary. Twenty-three leaders elected to participate. The remaining candidates declined without penalty.

According to the A through F school performance ranking system, applied by the Texas Education Agency (TEA) [44] to all state public schools, districts participating in this study fell in either the A or B category during the 2018–2019 academic year. Texas school and district rankings were determined by three primary areas: annual achievement gains, school progress compared to the prior academic year, and effectiveness in closing achievement gaps for underperforming student populations. Prioritized Lever 5 of the Effective School Framework, *Effective Instruction*, calls for site-based instructional leaders to review the disaggregated data to track and monitor student progress and provide evidence-based feedback to teachers. Teachers use a corrective instruction action planning process in their individual classrooms and PLC teams to analyze data, identify trends in student misconceptions, determine the root cause for students who did not learn the concept, and create plans to reteach and reassess. According to state education policy, PLC teams are expected to provide teachers with protected time during their contractual day to meet frequently, enabling teachers with opportunities for in-depth conversations about formative and interim student data, effective instructional strategies, and possible adjustments to instructional delivery [44]. All 16 districts implemented PLCs in their improvement plans. Budget documents provided by districts indicated varying levels of funding for PLC support, including professional development opportunities, material resources, and release time for PLC team activities during the contractual day. Each of the participating school districts conformed to this TEA requirement and were implementing PLCs.

Two factors regarding PLC implementation in the state of Texas were important considerations for this study. First, Texas is unique in mandating the implementation of PLCs for data-driven improvement planning at all K-12 public schools. While schools and districts were not obligated to participate in this study, those that did were operating under the Effective School Framework of TEA, requiring each school to implement PLCs for data-driven instructional plans. A second factor is that schools in this study perceive they are successfully implementing PLCs. For these reasons, Texas serves as a test case in determining the degree to which the state's schools believe the local district is supporting their success.

4.2. Sample and Data Collection

This study included 596 teacher participants from 16 school districts in north Texas. To increase the response rate, superintendents and school principals briefed teachers about the importance of this study to their schools and district central office. Nevertheless, participants were informed that participation in this study was voluntary, with no employment implications contingent upon their survey participation. Participants who agreed to participate signed a consent form with assurance that their identification will remain anonymous. Principals at each school distributed the survey to teachers via anonymous Qualtrics links and provided time for teachers to complete the survey during their contractual day.

There was a high overall survey return rate of 97%. Of the 596 surveys completed by teachers, 27.4% identified themselves as elementary or primary-level teachers, 22% as

middle-level teachers, and 51% as high-school-level teachers. Some surveys were missing one or two values; thus, we used mean imputation [45]. No surveys were returned missing more than two values, but had they been, we would not have included those responses. Before conducting the statistical analysis, we entered survey responses in SPSS 26.0 for Windows, looking for univariate outliers and normality as well as multivariate outliers and normality. We found nine outliers (seven univariate and two multivariate) that were not statistically significant, so they remained in the study.

4.3. Survey Instrument

There were two sections for the survey: 34 PLC questions and 6 district office (DO) questions. All questions were structured using a five-point Likert scale with response options ranging from 1 (*not at all*) to 5 (*a great deal*).

PLC survey component. The PLC component of the survey (modified slightly) drew from a previously developed instrument by [46] that explored the five attributes of Hord's [16] PLC model: Shared/Supportive Leadership, Shared Values/Vision, Collective Learning/Application, Shared Personal Practice, and Supportive Conditions. Drawing on 1209 surveys, the Cronbach's alpha test yielded a reliability coefficient of 0.89 ($\alpha = 0.89$). The modifications were confirmed after conducting the confirmatory factor analysis.

This PLC component consisted of 34 discrete items contained within each of Hord's [16] 5 PLC attributes: 6 addressed Shared/Supportive Leadership, 5 addressed Shared Values and Vision, 6 related to Collective Learning and Application, 9 addressed Shared Personal Practice, and 7 related to Supportive Conditions.

District office survey component. The district office component of the survey consisted of 6 items developed to measure school-based participants' perceptions about the level of district support for successful PLC implementation at their schools. Teachers were asked about the efforts of district leadership in supporting site-based PLCs, including the implementation of new grade-level or department PLCs, sustainment of existing PLCs, use of district policies and procedures that facilitate PLCs at the site level, recognition of successful school-based PLCs, provision of tangible and intangible resources provided by district leaders to support PLCs, supervision by district leaders advocating for the work of school-based PLCs, and professional development support provided to support strong collaborative teams.

4.4. Pilot Study

We called on experts in the field to review the PLC section for potential changes to the 40 survey items. Then, a pilot study, conducted through Qualtrics, was completed by 55 participants from one elementary and one middle school in the two studied districts. Participants were asked to provide feedback on the items in each survey section, PLCs and DO. We engaged pilot study participants to increase item reliability and validity. When we ran a factor analysis of pilot participants' responses, we found that no item adjustments were needed.

5. Data Analysis

For data analysis, we first conducted a confirmatory factor analysis (CFA) using SPSS and AMOS26 to determine the validity of the PLC and DO measures. We next applied descriptive statistics (mean and standard deviation) by school. Our third data-analysis procedure used Pearson's r correlation to determine the association between the five PLC and one DO variables, as well as the total PLC and total DO variables. Our final analysis used structured equation modeling (SEM) to examine the conceptual path model among district office administration support and the PLC dimensions defined by [43]. We used the statistical package SPSS 26.0 for Windows, SPSS, and AMOS26 for all statistical procedures [47].

Confirmatory Factor Analysis

We conducted a confirmatory factor analysis (Table 1) to determine the PLC and DO variables. The outcomes of this CFA showed that all the indices fit the hypothesized measurement model well. All fit indices obtained in the CFA had desirable magnitudes (CFI = 0.98; TLI = 0.97; NFI = 0.97; GFI = 0.97; RMSEA = 0.02; SRMR = 0.01), which indicate a good fit between the model and the data. The magnitudes of factor loadings for PLC measures ranged from 0.60 to 0.88 and, for DO, from 0.74 to 0.85; all were statistically significant at the 0.05 level. Internal consistency reliability coefficients (Cronbach's alphas) were 0.97 and 0.89 for PLC and DO factors, respectively, which are well above the acceptability threshold of 0.70. The Chi-square value was 1351.474 with the 500n degrees of freedom at the 0.001 level. Based on the data, the original variables remained the same. The items loaded as expected.

Table 1. Confirmatory factor analysis survey questions factor loadings.

	Statements	Factor Loadings
	Professional Learning Communities	
1	The staff is consistently involved in discussing and making decisions about most teaching and learning issues.	0.77
2	School leadership is proactive and addresses areas where support is needed.	0.80
3	Teacher and team taking risk and innovation are supported and recognized by school leaders.	0.74
4	Teachers play important leadership roles in this school.	0.76
5	School leadership helps teams that are struggling.	0.75
6	Teachers play a key role in determining and leading professional development.	0.73
7	Staff has shared vision for school improvement focused on student learning.	0.80
8	Decisions are made in alignment with the school's values and vision.	0.88
9	A collaborative process exists for developing a shared vision among staff and stakeholders.	0.84
10	Policies and programs are aligned to the school's vision.	0.87
11	Data are used to prioritize actions to reach the school's vision.	0.70
12	Teacher teams seek out new knowledge, skills and strategies to solve problems of practice.	0.74
13	As a staff, we ask "What can we learn?" when things don't go as expected.	0.78
14	Grade level or department teams plan strategies to meet needs of students at different levels.	0.78
15	The staff engages in dialogue that reflects a respect for diverse ideas that lead to continued inquiry.	0.81
16	Grade level or department teams collectively develop formative assessments to guide lesson planning.	0.70
17	Professional development focuses on evidence-based programs to strengthen instructional practice.	0.74
18	Teachers in this school have regular conversations about how to improve practice to ensure more students are mastering the curriculum.	0.72
19	Teachers in this school receive meaningful feedback from colleagues on their instructional practices.	0.73

Table 1. *Cont.*

	Statements	Factor Loadings
20	Teachers in this school regularly visit other teachers' classrooms to observe instruction.	0.60
21	I regularly invite colleagues to visit my classroom.	0.75
22	Grade level and department teams regularly and collaboratively review student work to improve their instructional practices.	0.70
23	Even in a difficult situation, teachers in this school can depend upon each other.	0.83
24	A culture of trust and respect exists for taking risks.	0.80
25	Teachers in this school respect the professional competence of their colleagues.	0.85
26	Relationships among the staff support honest and respectful examination of data to enhance teaching and learning.	0.79
27	Outstanding teacher and team achievements are recognized and celebrated regularly in our school.	0.73
28	Students have equal opportunities to be assigned to the best teachers.	0.66
29	Resources are allocated to support students who have greater needs.	0.68
30	All students receive the same quality of instruction.	0.70
31	In our school, staff meetings primarily focus on professional development.	0.68
32	Time is regularly provided for department or team meetings to address problems of practice.	0.72
33	Communication systems promote the flow of information (e.g., lesson plans, formative assessments, other key data) across the staff.	0.77
34	Struggling students receive the resources they need to succeed.	0.74
	District Office Support	
1	Our district is working to implement grade level or department learning communities in every school.	0.74
2	District policies or procedures make it easy for grade level or department learning communities to work effectively.	0.84
3	The district recognizes and celebrates schools that are successfully implementing professional learning communities.	0.80
4	The district provides resources and time for grade level or department learning communities to meet.	0.84
5	District staff have attended grade level or department learning community meetings to see the work we are doing.	0.78
6	The district provides professional development to support strong collaborative teams.	0.85

No other latent constructs were significant, and they were excluded for brevity. Rating scale is 1–5: *not at all to a great deal*. Cronbach's alpha: PLC = 0.97 (34 items); district office = 0.89 (6 items).

6. Results

Few studies explore the impact of district-level leadership support on the success of site-level PLC team implementation and sustainment. This quantitative study examined the role of district office leadership in building capacity for teachers engaged in PLCs at 21 rural, urban, and suburban public schools across 16 districts in north Texas. We measured the impact of district office leadership efforts to improve PLCs operating at their schools using survey questions that placed district office support as the independent variable measuring Hord's [43] five discrete PLC dimensions, including Shared and Supported

Leadership, Shared Values and Vision, Collaborative Learning and Application, Shared Personal Practices, and Supported Conditions. For each PLC survey question, district mean scores revealed the overall levels of PLC characteristics teams employed. We found a Cronbach's alpha reliability of 0.97 ($\alpha = 0.97$); thus, we were confident that the PLC survey items had internal consistency, like DO items that also showed strong internal consistency at 0.89 ($\alpha = 0.89$). Analysis revealed that the districts' overall PLC mean score was 3.86, providing confidence that the districts implemented a high level of PLC characteristics. Table 2 shows the overall PLC and DO mean scores by school.

Table 2. Mean PLC and DO scores by school based on 5-point Likert scale. Total participants and 2018 and 2019 Academic Rankings by school.

District	School	Mean PLC	Mean DO	<i>n</i>	Academic Ranking 2018	Academic Ranking 2019
ISD 1	School 1	4.17	4.20	8	A	A
ISD 1	School 2	3.78	3.60	5	A	A
ISD 2	School 3	3.52	3.40	24	A	A
ISD 3	School 4	4.06	3.38	11	C	B
ISD 4	School 5	4.24	4.03	41	B	B
ISD 5	School 6	3.58	3.48	19	C	A
ISD 6	School 7	4.09	3.89	47	A	A
ISD 6	School 8	4.20	4.05	44	A	A
ISD 6	School 9	4.00	3.96	10	A	A
ISD 6	School 10	3.55	3.23	18	A	A
ISD 7	School 11	4.07	4.13	12	A	A
ISD 7	School 12	3.86	3.85	66	A	A
ISD 8	School 13	3.49	3.67	12	B	B
ISD 8	School 14	3.92	3.5	37	B	B
ISD 8	School 15	3.68	3.41	33	B	A
ISD 9	School 16	3.37	3.42	10	A	B
ISD 10	School 17	4.00	3.60	22	B	B
ISD 11	School 18	3.56	3.11	39	B	B
ISD 12	School 19	3.53	3.28	21	C	B
ISD 13	School 20	3.69	3.55	22	B	A
ISD 14	School 21	3.83	3.81	58	A	B
ISD 15	School 22	3.99	3.77	31	B	B
ISD 16	School 23	3.54	3.47	6	C	B
Overall Mean Scores and Total <i>n</i>		3.86	3.68	596		

Data were collected from the Pearson Product Moment Correlation Coefficient Test (PPMCCCT) (Table 3). Combining all survey items provided a total PLC score and a total DO score, and then both PLC and DO subscales were analyzed. An analysis of both the PLC and DO totals revealed a significant correlation ($r = 0.734$; $p < 0.01$). Clearly, there is a positive relationship between how teachers perceived the function of their PLC teams and the level of district office support provided to ensure PLC team success.

Table 3. Correlations among PLC subscales and DO support subscale. ($n = 596$).

	1	2	3	4	5	6	7
1. District Office Total	-						
2. PLC Total	0.734 **	-					
3. Shared Supported Leadership	0.637 **	0.883 **	-				
4. Shared Values/Vision	0.581 **	0.849 **	0.815 **	-			
5. Collective Learning/Application	0.650 **	0.891 **	0.703 **	0.659 **	-		
6. Shared Personal Practice	0.679 **	0.921 **	0.737 **	0.686 **	0.819 **	-	
7. Supportive Condition	0.698 **	0.895 **	0.723 **	0.710 **	0.753 **	0.775 **	-

** Correlation is significant at the 0.01 level (Two-tailed) $p < 0.01$.

Total DO was also found to be significantly correlated to Shared Supported Leadership ($r = 0.637$; $p < 0.01$), Shared Values and Vision ($r = 0.581$; $p < 0.01$), Collective Learning/Application ($r = 0.650$; $p < 0.01$), Shared Personal Practice ($r = 0.679$; $p < 0.01$), and Supportive Condition ($r = 0.698$; $p < 0.01$). These findings provided further evidence that district leaders' support of site-level PLC teams is necessary. The overall correlation findings between the variables are seen in Table 3.

We next employed structural equation modeling (SEM) to examine possible relationships between DO and PLC. This statistical analysis technique looks for the goodness of fit of data and provides descriptive and diagnostic data regarding model fit. Additionally, the inclusion of measurement errors in defining each item allows for a more precise estimation of the relationships among the variables. For this analysis, there must be a correlation between the independent and dependent variables to ensure mediation in the model. SEM is also very sensitive to a rigorous sample size.

In Figure 1, the goodness-of-fit indices for the relationship between the independent variable, district office support, and the dependent variables, which include the PLC Total, Shared and Supported Leadership, Shared Values and Vision, Collaborative Learning and Application, Shared Personal Practices, and Supportive Conditions, are depicted. The six indices considered were as follows: comparative fit index (CFI), Tucker–Lewis index (TLI), normed fit index (NFI), goodness-of-fit index (GFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). When the coefficient for CFI, TLI, NFI, and GFI is larger than 0.95 [47] and there is a coefficient of less than 0.05, there is a good fit for the RMSEA [48]. Cronbach's alpha should at least be 0.70. In our study, all model fit indices demonstrated a good fit of the data to the model (CFI = 0.98, TLI = 0.97, NFI = 0.97, GFI = 0.97, RMSEA = 0.02, and SRMR = 0.01). A Cronbach's alpha of 0.971 indicates a strong reliability of the model. This figure also shows the path analysis results for standardized coefficients, which suggests that the presence of DO administrative support predicts higher-functioning PLC teams. SEM results demonstrate a significant predictive relationship between the DO variable relative to the total PLC and Hord's five PLC dimensions. For example, DO support is a significant predictive indicator of increased total PLC. In addition, DO support is significantly predictive of all five of Hord's PLC dimensions.

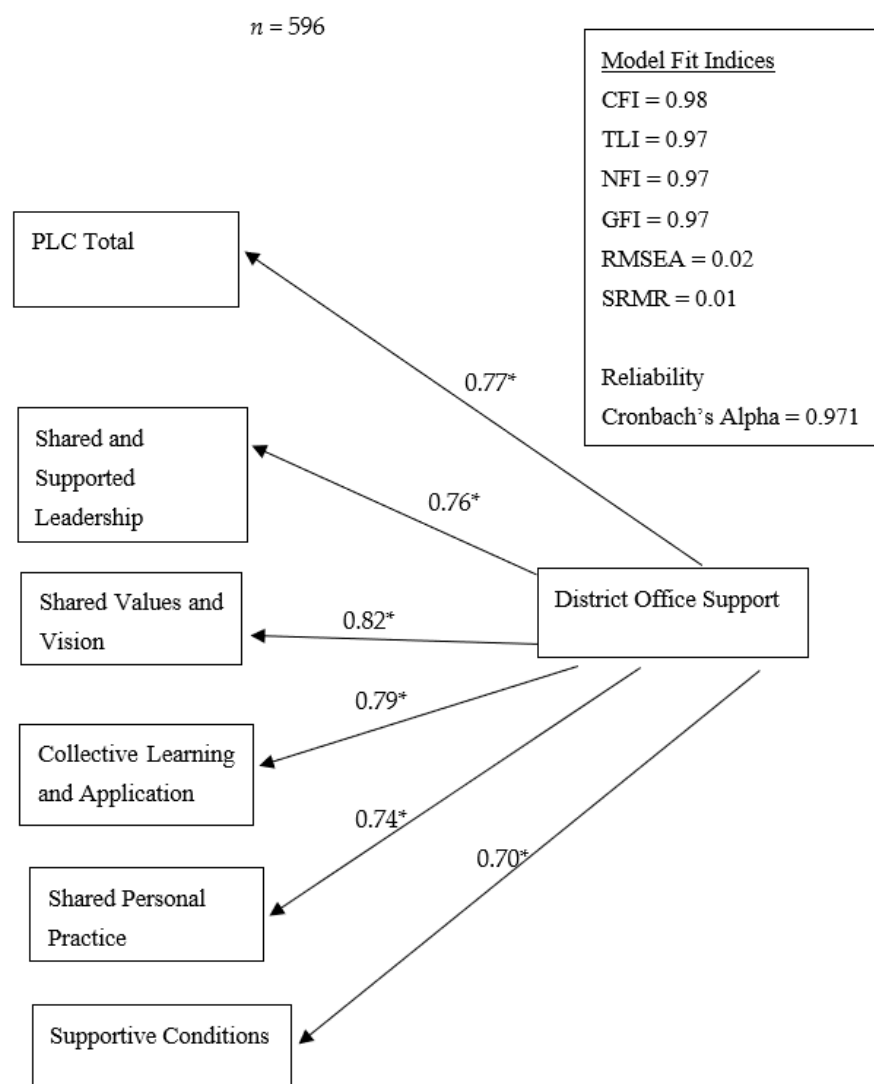


Figure 1. Path analysis of district office support to total PLC and each of Hord's [43] five dimensions with standardized coefficients. * statistically significant at $p < 0.05$ level.

7. Discussion and Conclusions

This study explored the predictive relationship between district leader support and PLCs within each of Hord's five dimensions of effective PLCs. Prior research [22] linked the role of principals as the primary source of school-level PLC support. Our study focused on survey data collected from 596 teachers in 21 schools in 16 districts across north Texas to strengthen our understanding of how district leadership supports site-level PLC teams. We applied a conceptual framework designed to consider that highly effective PLCs are the product of organizational social capital drawn from the contributions of its members as measured within each area of Hord's model. Figure 1 shows how SEM multivariate analyses yielded high correlations to construct paths between the data and the theoretical model.

Our findings showed statistically significant outcomes overall ($r = 0.734$; $p < 0.01$), clearly indicating teachers perceived high levels of DO leadership and organizational support for PLC operations at the school level, including strong correlations between the DO Total ($\beta = 0.77$) and each of five discrete areas of Hord's dimensions for effective PLCs. Overall, participants believed, for example, that the DO supports the work of PLC teams to strengthen their Shared Personal Practice ($\beta = 0.74$) in building collegiality, developing trust, gaining commitment, and other factors that facilitate professional collaboration [17]. Teachers also indicated their schools and districts supported ongoing, regular conversations about how to improve practice to ensure more students are mastering the curriculum

($r = 0.679$; $p < 0.01$). Further, teachers indicated that DO leaders supported their professional learning and its clinical use ($r = 0.650$; $p < 0.01$) within the area of Collective Learning and Application ($\beta = 0.79$). Thus, teachers believed that DO support enabled them to operate within a reflective culture of job-embedded accountability [28], a hallmark of effective PLCs [22].

Teachers indicated that they considered district office interaction an essential part of PLC operations, a key attribute of Shared and Supported Leadership ($\beta = 0.76$) evident in successful PLCs. In addition, school staff strongly believed they operated in alignment with the district's vision for improvement that focused on increased student learning outcomes at their schools ($r = 0.581$; $p < 0.01$). High levels of confidence in DO support for Shared Values and Vision ($\beta = 82$) suggested that teachers felt they were operating in a culture of trust supportive of conditions that free PLCs to move beyond minor distractions toward planning improvement for higher student achievement outcomes [10,21]. Finally, participants strongly believed that their districts provided school-level PLC teams with both tangible and intangible supports essential for the success of teachers and their students ($r = 0.698$; $p < 0.01$). Data outcomes for supportive conditions ($\beta = 0.70$) reflected teachers' beliefs that school and district policies or procedures facilitate effective support for teacher-learning communities and students.

The significance between district office leadership and its support for site-level PLC teams strongly suggested that teachers considered support from the district level essential to their success as measured within each of Hord's [43] five dimensions for PLC success. Overall, high correlations linked participants' perceptions of their PLC success and effectiveness to supports such as high-quality professional development, protected meeting time, student-centered improvement initiatives, and other key resources they received from district leaders. Further, teachers perceived their districts valued their participation in the PLC process. They considered district leaders interested in the work their PLCs were performing and believed their districts were making efforts to expand PLCs in schools across the district.

7.1. Implications for Practice

This study revealed several practical implications regarding the role of district leadership as key to successful school change and PLC implementation [31,43]. First, local boards of education, the superintendent, and school leaders must clearly define their vision for the district's role in supporting PLCs. District leadership must then become intentional in communicating their role in supporting PLCs, focusing on steps for implementation, human and capital resources, and other resources the district has committed to PLC support. Further, school and district leaders must monitor progress to ensure that resources are allocated, barriers are mitigated, and lines of communication remain open and ongoing. Supporting clear, consistent, ongoing communication will help build relationships and teacher confidence, fostering the organizational social capital that schools and districts need for success [49]. District officials should also recognize each school's unique needs, including the equitable distribution of tangible and intangible resources. Finally, while participants believed that the district recognized and celebrated PLC success, district leaders must facilitate PLCs in seeking opportunities to present their work to local boards of education, community partners, and other audiences vested in improving schools.

7.2. Future Research

This study paves the path for broader studies that include more districts and schools to continue to explore relationships between district office leadership support for site-level PLC teams. Research methods should apply an explanatory sequential design model such as Creswell [50] suggested, drawing from overall study results in addition to outcomes from each of Hord's five discrete dimensions to gain a deeper understanding of the district's role in supporting successful PLCs. A review of district policies and procedures that drive decisions concerning the implementation and support of PLCs at the school level should

be a central focus. In addition, a closer examination of district leader commitment to the PLC process should be an integral part of future studies.

While study outcomes suggested there were high levels of teacher confidence in DO leadership support for PLCs, the extent to which the state mandates for PLC implementation may have influenced teachers' responses is unclear. Research considerations should focus heavily on the roles of local boards of education, the superintendent, district administrators, and other policymakers responsible for implementing decisions enacted from district policy. Areas of inquiry should include budgetary processes, allocation of human and capital resources, instructional support, and other policy drivers that may become either barriers or bridges for teachers and PLCs. Further, ongoing studies should highlight districts where PLCs are not mandated at the state level. Finally, while school and district demographics were beyond the scope of this study, high student poverty levels, as high as 86.7%, were reported, with 13 districts reporting low socioeconomic student populations at 22.6% or higher. As research soundly links low socioeconomic status to factors placing students at risk of academic failure, a deeper exploration of district support is recommended for school-level PLCs in supporting targeted student groups, including those qualified as low SES and other populations at risk for academic success.

Author Contributions: Methodology, F.N.; writing—original draft, R.H.V.J. and C.W.J.; writing—review and editing, R.H.V.J. and C.W.J. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of University of North Texas (protocol code IRB-18-110 and 4.12.2018). for studies involving humans.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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