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REGULAR ARTICLE

Exploring the Characteristics of Professional Learning Communities in China: A Mixed-Method Study

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Abstract This mixed-method study explored the characteristics of professional learning communities (PLCs) in Chinese schools. Informed by the existing literature on PLCs, the authors conducted a questionnaire survey of teachers in seven schools in Shanghai to explore the characteristics of Chinese PLCs. Follow-up qualitative interviews were also conducted to examine the underlying reasons for such characteristics perceived by teachers. Results show that PLCs in the Chinese schools can be conceptualized in terms of collaborative learning, professional competency, facilitative leadership, structural support, and cultural barriers, which can be attributed to school education system, traditional social cultures, and ways of teacher recognition. Practical implications as well as suggestions for future research are also provided.

Keywords Professional learning communities · Chinese cultures · Shanghai · Context specificity

Introduction

Since Hord's seminal research in 1997, the concept of professional learning community (PLC) has received considerable attention in the educational field. Evidence from different educational contexts (e.g., USA, UK, and Australia) suggests that developing PLCs significantly contributes to school reforms and development by providing a facilitative environment in which teachers work together to improve their teaching practices and enhance students' learning (Fullan 2003).

Virtually, educational context matters a lot to the practices of PLCs, as Wenger (1998) claims that PLCs form and develop with particular "historical, social and institutional discourses and styles" (p. 141) in certain contexts. Thus in PLC research, it is necessary to take into account the specific institutional and socio-cultural contexts where PLCs are located. To date, while most of the existing literature on PLCs has focused on Western settings (Hairon and Dimmock 2012), the concept and practice of PLCs in Asian contexts, particularly China, have largely been ignored. In fact, working together is not new to Chinese teachers, and a "well-articulated structure" (Paine and Ma 1993, p. 675) for teacher collaboration which consists of Teaching Research Group, Lesson Preparation Group, and Grade Groups has existed in Chinese schools for decades. Previous studies (e.g., Hu 2013) have found that while these groups share the similar features and functions with PLCs in western contexts, they exhibit their own distinctive characteristics which are influenced by the Chinese educational systems (featured by top-down management with an emphasis on command and control) and socio-cultural factors (such as collectivism) (Chen 2006). Therefore, investigating the Chinese version of PLCs is important, which can enhance our knowledge of the pivotal role of context in shaping and reshaping PLCs.

Adopting a mixed research design, this study examines the forms and processes of PLCs in seven schools in Shanghai, China. Such information can contribute to the understanding of PLCs from the Chinese perspective, and shed light on how the practices of PLCs can be influenced by various institutional and socio-cultural forces. It can also provide important implications for policy makers and school leaders about how to address context specificity in order to promote PLCs in their own educational settings.

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Literature Review

While the concept of PLCs is interpreted differently in various educational contexts (Stoll et al. 2006), some consensuses on its basic ideas have been reached. As Dufour and Eaker (1998) expound, in a PLC, educators create an environment that "fosters mutual cooperation, emotional support, and personal growth as they work together to achieve what they cannot accomplish alone" (p. xi).

Hord (1997) conceptualizes and argues that PLCs should have the following five characteristics: shared and supportive leadership, shared values and vision, collective learning and application, shared personal practice, and supportive conditions. Such conceptualization has been widely acknowledged and received extensive application in different educational contexts. For instance, Hipp and Huffman (2010) carried out a few studies under this theoretical framework and sought evidence to support the existence of these characteristics. Their studies not only confirmed the five subscales, but also found that collective learning and application was highly correlated with shared personal practice.

First, shared vision and values in Hord's conceptualization is considered a fundamental characteristic of PLCs by many scholars (Stoll et al. 2006; Wells and Feun 2007). They believe that only when teachers share a common vision and value systems which attach importance to student learning, can PLCs be effectively implemented. This shared vision base provides preconditions for schools' cultural change and sustained growth (Lindahl 2011).

Second, collective learning and inquiry are crucial to the practice of PLCs (Dufour 2003; Wells and Feun 2007). Researchers claim that the notion of community which suggests collective learning rather than traditional individual learning demonstrates the central idea of PLCs (Hairon and Dimmock 2012). Specifically, Teachers are expected to share ideas and materials, jointly plan and investigate, collectively reflect and solve problems, and continuously improve teaching and learning practices in PLCs.

Accompanied with this is the third characteristic of shared personal practice such as peer observations, lesson study and open lessons (Lindahl 2011). A core idea in shared practice is to nurture collegial relationship among teachers (Louis et al. 1996). Concrete strategies such as developing critical friends and subject teams are facilitative to such relationship (Malone and Smith, 2010). In this way, teachers get opportunities to learn from each other, and can also obtain meaningful feedback, which holds promise for their collective capacity building.

The fourth important construct of PLCs is shared and supportive leadership. Researchers (e.g., Huffman and Jacobson 2003) suggest that if teachers are empowered to participate in decision-making process of school issues and initiate reforms in terms of teaching and learning, PLCs would be more likely to flourish. Besides, when principals are good at improving working environment to foster collaboration, offering professional training to teachers, and building connections with external agents such as universities (Hord and Sommers 2008; Little 2002), the development of PLCs would be significantly promoted.

The last characteristic of PLCs is about supportive conditions. As Hord (1997) puts forward that supportive structures and relations are essential for the development of PLCs, the effectiveness of practicing PLCs in schools depends on a number of contextual factors. On the one hand, structural conditions of school organizations need to be optimized to facilitate PLCs. Specific support encompasses collaborative time and physical proximity (Louis et al. 1996), sufficient resources in terms of funding, materials, facilities (Kilbane 2010), and so forth. On the other hand, working on relationship building, especially fostering cultures featuring trust, sharing and collegiality among teachers is conductive to PLC practice (Stoll et al. 2006). Meanwhile, effectively managing conflicts generated from collective inquiries and prompting deeper dialogues are also vitally important (Hord 1997).

Thus, we can see that the characteristics of PLCs consist of not only teachers' collaborative efforts such as shared vision and values, collective learning, and shared practice, but also schools' supportive conditions such as facilitative leadership, favorable structures, and advantageous relations. In other words, the concept of PLCs can be defined by the five characteristics of shared vision and values, collective learning, shared personal practice, shared and supportive leadership and supportive conditions which are operated at both the individual teacher level and the organizational school level.

However, shared and collaborative practices in PLCs are fairly difficult to accomplish, as quite a few barriers exert negative impact on the development of PLCs, among which unfavorable cultures such as privacy, individualism and conservatism are the most prominent obstacles (Harris and Jones 2010). These passive cultures would strongly resist innovation, thus go against the practice of PLCs. Therefore, developing PLCs is a long process with numerous challenges (Wells and Feun 2007).

Furthermore, what is noteworthy is that almost all of these findings are derived from western contexts; little has known about the features of PLCs in Asian settings. Given that PLCs in Chinese schools are shaped by their own institutional and cultural forces, exploring the nature of these PLCs can provide insights into the impact of context on the practices of PLCs.

PLCs in the Chinese Context

Chinese schools have a long history of practicing PLCs, though not explicitly stated in such a concept. As early as 1950s, teacher groupings were set up with a top-down approach (Chen 2006), in which teachers were mandated to carry out collective lesson planning and teaching inquiry. After a long period of development, collaborative practices have been institutionalized, and a culture of contrived collegiality (Hargreaves 1994) has gradually been formed, which is characterized by administrative compulsory instead of teacher spontaneous collaboration. In this sense, PLCs in Chinese schools are kind of contrived communities (Wong 2010). Accordingly, they not only perform the function of teaching inquiry as professional groups, but also undertake the function of management as administrative organizations.

Specifically, there are three kinds of teacher groupings in Chinese schools that can be understood as the forms of PLCs, including Teaching Research Groups (TRGs, *jiao yan zu*), Lesson Preparation Groups (LPGs, *bei ke zu*), and Grade Groups (GGs, *nian ji zu*).

In each school, teachers of the same subject form a TRG which aims to improve classroom teaching via teachers' collective work. Regular activities organized by TRGs include collectively learning new theories and educational policies, joint lesson planning, collective observations of open lessons with post-lesson discussions, peer observation and peer coaching, and conducting action research projects. To a large extent, these activities have been incorporated into teachers' daily work, and thus forming a community with ample significant opportunities for professional development (Wang 2008). LPGs are the second form of PLCs commonly found in large schools. They are made up of teachers of the same subject and in the same grade. That is to say, each TRG is composed of various LPGs at different grade levels. The third form of PLCs is GGs, which consist of teachers of different subjects from a same grade. They meet regularly to discuss not only on students' academic performance, but also on their developmental needs in terms of moral, physical, social and aesthetic aspects, with a purpose of promoting students' holistic development.

These three forms of PLCs are parts of the formal structure of Chinese schools, and are pervasive throughout the whole education system of China, whether in most affluent urban cities, or most underdeveloped rural areas (Sargent and Hannum 2009). More importantly, they are rooted in the specific Chinese schooling system, especially the Teaching Research System (*jiaoyan xitong*). Under such a system, teachers within the same PLC share a common office, and they are scheduled to spend plenty of time working together. There is also strong district support for PLCs, i.e., expert teachers in the district office regularly offer professional guidance for teachers (Tsui and Wong 2009). Besides, quite a number of schools have established partnership with universities, which promotes the mutual interaction and development between practice and theory (Ye 2009). With these external resources, the boundary of PLCs is expanded to introduce new ideas. All these reflect the distinct Chinese schooling context and exert profound impact on the practices of PLCs. Since there are few studies focusing on PLCs in Chinese schools, exploring the characteristics of Chinese PLCs is of vital importance.

Methodology

Research Questions

The research questions of this study are as below:

1. What are the characteristics of PLCs in Chinese schools?
2. What are the reasons for such characteristics perceived by Chinese teachers?

A mixed-method approach was adopted in this study. Specifically, the first question was addressed by the exploratory quantitative study, in which a self-created questionnaire was used to explore the characteristics of PLCs in schools of Shanghai. The second question was answered through a follow-up explanatory qualitative research, in which semi-structural interviews were conducted to probe into the underlying factors for the salient characteristics of PLCs perceived by teachers.

Participants

The participants of the study were a convenience sample of 175 teachers in seven schools of Shanghai. The seven schools diversified in terms of level, size, location, history, and educational level. These school contextual factors may determine the configuration of PLCs (Stoll et al. 2006). There were five elementary schools and two secondary schools. Of the seven schools, three were of large-size, two were of medium-size, and two were of small-size. There were three schools located at urban districts, while the other four in rural areas. Two schools had a history of more than a hundred years, three had been existing for a few decades, and two schools were just erected within the last ten years. Five of the seven schools were ranked top in terms of performance in their respective districts, while the other two were developing schools. Such a sample is good representation of the overall school population in Shanghai.

The demography of the 175 teachers varied in terms of gender, subject, teaching years, and positions. In which, 78.9 % (138) were female, and 21.1 % (37) were male.

78.1 % (136) of the participants taught core subjects (Chinese, Mathematics, and English); 20.5 % (36) taught subjects such as history, politics, geography, biology, and physics which were the core elective courses; and 1.4 % (3) taught subjects such as music, art and society, which were the other elective courses. There were 34.0 % (59) of participants whose teaching experience were not more than five years, 27.9 % (49) were six to fifteen years, and 38.1 % (67) with more than sixteen years of teaching experience. There were 24.0 % (42) of participants working as team leaders, and 76.0 % (133) working as ordinary teachers. Although the sample was not randomly selected, it did close to the distribution of the teacher population in Shanghai schools to some extent.

Data Collection

To answer the first research question, a questionnaire was developed according to a hypothetical framework based on extensive literature review, in which the authors hypothesized that the five basic characteristics of PLCs should include shared vision and values, collective learning, shared personal practice, shared and supportive leadership, and supportive conditions (Hord 1997). The literature review supported that these five characteristics can operate at both the individual teacher level and the organizational school level, so we attempted to operationalize these key concepts of PLCs in Chinese context at two different levels. Among the five characteristics, shared vision and values, collective learning and shared personal practice were classified at the individual level, which referred to how teachers perform in collaborative learning and sharing visions, values and practices. Shared and supportive leadership and supportive conditions were categorized at the organizational level, which referred to how schools support PLCs in terms of leadership and organizational and social infrastructure.

Based on this framework in the Chinese school context, a questionnaire with 59 items was developed to comprise most of the practices under the five hypothetical subscales. All the items examined teachers' perceptions of the PLC subscales. Teachers were requested to rate the items on a six-point Likert scale from 'strongly disagree', 'disagree', 'slightly disagree', 'slightly agree', 'agree' and 'strongly agree' with '1' indicating 'strongly disagree' to '6' indicating 'strongly agree'. The questionnaire was administered to teachers in the seven schools at the same period of time. In view of schools with different sizes, the number of teachers responding to the questionnaire in each school varied, ranging from 15 to 37. Teachers had about 20 min to respond to all the items in the questionnaire. In total, 175 useful returns were obtained and the return rate was 87.5 %.

To answer the second research question, semi-structured interviews with teachers in the seven schools were conducted by the first author. Twenty teachers volunteered to participate in the interviews and those with rich teaching experiences (and hence a long time participation in PLCs as mandated by their schools) were selected for the interview as they could provide rich information about their experiences in PLCs. From each school, there were two teachers interviewed, thus the sample was a total of 14 teachers. During the interviews, the teachers were asked not only to elaborate on the five characteristics of PLCs in the survey, but also share opinions about reasons why such characteristics exist in their schools. Generally, each interview lasted for 45 min. All the interviews were audio-recorded and entirely transcribed by the first author.

Data Analysis

For the quantitative part, the data from the PLC questionnaire were analyzed using principal component analysis (PCA) and descriptive analysis by the software of SPSS 18.0. The PCA was used to explore the existence of characteristics of PLCs in Chinese schools, and the descriptive analysis was employed to demonstrate the reliability of the questionnaire and the general development of the sampled schools in terms of these PLC characteristics.

For the qualitative part, the authors adopted open coding, axial coding, and selective coding (Strauss and Corbin 1998) step by step to analyze the data, which means first identifying the main themes of potential factors for PLC characteristics, then categorizing the coding strips and lastly selecting those suitable ones for this study. To ensure the validity, the coding process was first separately conducted by the two authors, after that the preliminary analysis was checked by each other, and an agreement on the final coding result was reached through the two researchers' discussions.

Findings

The Characteristics of PLCs in Chinese Schools

As the PLC practices were conceptualized initially at two different levels, we used PCA separately for the individual level items and the organizational level items, in order to explore the multidimensionality of PLCs. The results of the PCA of teachers' views at the individual level and the organizational level are shown in Tables 1 and 2 respectively, in which the structure, loading, eigenvalue, and percentage of explained variance of respective factors are also provided.

Table 1 Factor loadings for principal component analysis with oblique rotation for the individual level of PLC items

Items		Component	
		1	2
1.	Teachers who participate in outside school training will share with us the critical information and materials	**0.812**	−0.054
2.	My colleagues and I collaboratively work on the teaching approaches	**0.792**	−0.209
3.	My colleagues and I often review and reflect on the school development plan	**0.739**	0.028
4.	My colleagues and I often have reflective dialogues on teaching	**0.713**	0.099
5.	I have a sense of belonging to the school	**0.705**	0.094
6.	Teachers exchanged with each other to form the school development goals	**0.697**	0.072
7.	My colleagues and I trust each other	**0.632**	0.031
8.	My colleagues and I are willing to learn continuously	**0.591**	0.063
9.	My teaching questions get effective feedback or solution from other teachers	**0.474**	0.055
10.	I could improve the way I think about teaching problems after discussing with my colleagues	0.100	**0.741**
11.	I have a strong sense of responsibility for student learning	−0.053	**0.710**
12.	I could have a new understanding of the teaching problems after discussing with my colleagues	0.026	**0.701**
13.	I have solid base of professional knowledge	0.293	**0.516**
14.	I will apply new ideas to solve the teaching problems	0.034	**0.514**
15.	I improve teaching experiences according to students' learning outcome	0.233	**0.447**
16.	I have the right to carry out reforms according to teaching practices	−0.056	**0.447**
17.	I can decide how to deal with the problems that I meet in teaching practice	−0.032	**0.425**
Eigenvalue		**5.948**	**1.589**
% of variance explained		**34.99**	**9.35**

Principle component analysis and oblique rotation were used in the factor extraction

Salient variables are those with factor loadings greater than 0.3 in absolute value, which is printed in bolded typeface

The eigenvalue and percentage of explained variance of respective components are printed in bolded typeface

Based on the meanings of the grouped items, Component 1 is named as "Collaborative Learning" and Component 2 is named as "Professional Competency"

As indicated in Tables 1 and 2, after PCA, two subscales at the individual level were resulted, including collaborative learning and professional competency; while three subscales at the organizational level were resulted, including facilitative leadership, structural support, and cultural barriers (negative variable). Compared to our proposed hypothetical framework grounded in literature review, PLCs in Chinese schools not only shared most of the fundamental characteristics, but also possessed some distinctive features. Specifically, four of the five hypothetical characteristics including collective learning, shared personal practice, shared and supportive leadership and supportive conditions were validated, although minor differences appeared, such as the subscale of collective learning and shared personal practice were extremely correlated and combined into one variable (collaborative learning), while the subscale of supportive conditions were divided into two variables (structural support and cultural barriers). But more notably, the subscale of shared vision and values disappeared, whereas a new variable of professional competency emerged. Thus, the conceptualization of PLC in Chinese school context was revised accordingly.

At the individual level, the two subscales that are operationalized are as follows:

1. Collaborative learning–referring to how teachers perform in learning collaboratively, such as joint lesson planning, sharing practices and resources and collectively solving teaching problems. This subscale integrates the two hypothetical variables of collective learning and shared personal practice, as they are highly correlated in the Chinese context. It means that teachers' collaborative learning activities are accompanied by mutual sharing, and these two kinds of inseparable practices together form the core attribute of Chinese PLCs.
2. Professional competency–referring to how teachers perform in terms of professionalism during the collective learning practices, including their expertise, abilities, attitude, responsibilities, and teaching behaviors. This subscale is a new one compared to the hypothetical framework, which reflects the specificity of Chinese context. For Chinese teachers, collaborative learning activities such as joint lesson planning and collective inquiry of open lessons are the major approach of professional development (Wang 2008). In this case, teacher professionalism is adequately represented in the practices of PLCs, and thus relevant attributes combine into the new variable of professional competency.

Table 2 Factor loadings for principal component analysis with oblique rotation for the organizational level of PLC items

Item		Component		
		1	2	3
1.	The principal let us to participate in the decision-making process of school affairs	**0.905**	0.110	−0.049
2.	The teacher appraisal system of our school encourages us to learn continuously	**0.873**	−0.010	−0.112
3.	School leaders learn about how we are learning from time to time	**0.833**	0.007	−0.023
4.	The principal understands our learning needs	**0.810**	0.034	0.152
5.	School leaders observe whether we use new strategies in the teaching practice	**0.716**	−0.074	0.111
6.	School has a special mechanism to facilitate change	**0.696**	−0.073	0.043
7.	The principal provides us opportunities for training and further study	**0.646**	0.061	0.238
8.	The principal encourages us to change	**0.616**	−0.231	−0.037
9.	School leaders regularly invite outside experts to give us lecture or training	**0.479**	−0.018	0.213
10.	Teachers are reluctant to share teaching materials	0.104	**0.781**	−0.035
11.	When meeting with problems, we put the blame on others	−0.034	**0.718**	0.055
12.	I dare not to raise different ideas in group activities	−0.121	**0.662**	−0.100
13.	Experienced teachers don't respect the opinions of young teachers	−0.131	**0.633**	−0.271
14.	The school attaches more emphasis on inheritance than creativity	−0.055	**0.538**	0.073
15.	Our school doesn't advocate for innovative teaching	0.024	**0.383**	0.017
16.	School leaders observe our collective activities regularly	−0.036	0.079	**0.856**
17.	Our school requires us to summarize our learning activities regularly	0.025	0.090	**0.797**
18.	We have regular time to conduct exchanges and discussions according to the school's scheduling	0.248	0.107	**0.724**
19.	Our school rewards teachers who initiate research projects and invite others to participate	0.230	−0.083	**0.569**
20.	Our school provides books and materials to encourage us to learn.	0.267	−0.039	**0.554**
21.	I could exchange with my colleagues informally about teaching ideas	−0.122	−0.220	**0.496**
22.	The principal empower us to carry out school activities	0.203	−0.073	**0.390**
Eigenvalue		**8.424**	**2.242**	**1.387**
% of variance explained		**38.29**	**10.19**	**6.31**

Principle component analysis and oblique rotation were used in the factor extraction

Salient variables are those with factor loadings greater than 0.3 in absolute value, which is printed in bolded typeface

The eigenvalue and percentage of explained variance of respective components are printed in bolded typeface

Based on the meanings of the grouped items, Component 1, 2, and 3 are named as "Facilitative Leadership," "Cultural Barriers," and "Structural Support"

At the organizational level, the three subscales that are operationalized as are follows:

1. Facilitative leadership–referring to the extent to which school leaders promote PLC development, such as understanding teachers' learning needs, providing training opportunities, empowering teachers, and introducing external resources to promote teachers' professional learning. This subscale indicates that school leaders' support in Chinese PLCs is quite prominent. Leaders in Chinese schools not only devote themselves to the enhancement of teachers' professional learning, such as participating in PLC activities and offering help, but also attach great importance to outside resources, such as making efforts to involve local expertise and university professionals into the development of PLCs (Ye 2009).
2. Structural support–referring to the extent to which the school's organizational structures support PLC development, including collaborative time, space, resources, funding, facilities, etc. This subscale suggests the supportive conditions in terms of structures in the hypothetical framework. It is closely related to the Chinese schooling system, which guarantees organizational support such as time, space, and facilities for PLCs.
3. Cultural barriers–referring to barriers that hinder the development and sustainability of the PLC practice, such as school values which impede innovation, cultures of disrespect and non-openness, and negative interpersonal relations. This is a negative subscale, as it measures the unsupportive relationships and cultures in PLCs. Initially, there are both positive and negative items in the questionnaire, but after PCA, only the negative ones converge and thus form the independent component of cultural barriers. It not only implies

negative cultures exist in Chinese schools, but also confirms the existing research findings that cultural barriers of PLCs are significant and the path to successful PLCs is no easy (Wells and Feun 2007).

The basic descriptive statistics and the reliability coefficients of the five subscales are shown in Table 3. The reliability coefficients of the five subscales range from 0.70 to 0.92, indicating that they are reliable measures of teachers' perceptions of the practice of PLCs in the schools of Shanghai.

Table 3 also suggests that teachers in the seven schools of Shanghai scored relatively high in the perceptions of collaborative learning, professional competency, facilitative leadership, and structural support, ranging from 4.51 to 5.07; while they scored 2.44 in the perceptions of cultural barriers, which was relatively low. This implies that the sampled schools in Shanghai have good practices of PLCs from an overall perspective.

Reasons for the Characteristics of PLCs Perceived by Chinese Teachers

Qualitative findings show that the five characteristics of Chinese PLCs could be explained by three kinds of factors, including the school education system, traditional social cultures, and ways of teacher recognition.

First, owing to the distinctive features in the Chinese school education system, particularly the Teaching Research System, structural support, and facilitative leadership are quite distinct in PLCs. The establishment of formal teacher groups such as TRGs provides strong structural support for PLCs in terms of time, physical space, and resources:

> Every Tuesday afternoon, our English teachers will have no lessons. Such arrangement guarantees our free time for meetings. (S1T1)
>
> Because we (teachers in the same LPG) are resided in the same office, and we teach the same subjects, should there be any problems coming up, we will discuss the issues altogether…there is also financial resources that support us in solving new problems. (S7T1)

This kind of organizational structures for PLCs is well addressed by most teachers. To a large extent, such a practice penetrates throughout the entire school education system of Shanghai, since the Teaching Research System request that all schools should have allowed time, space and necessary resources for teacher collaboration.

In addition, school leadership is requested to play a role in facilitating the practices of PLCs by the Teaching Research System. It is expected that school leaders should encourage teachers to work collaboratively to enhance student learning (S5T1). PLCs such as TRGs are established a main purpose of improving teaching effectiveness through teachers' collective work. Schools are assessed by the education authority based on the overall teaching performance of Grade Groups in terms of average achievement of all students in the same grade, rather than teachers' individual performance in terms of average achievement of students within a single class. Therefore, promoting teachers to work together is the key task of school leaders:

> They (the Education Bureau) evaluate the entire grade…. So our school leaders require us to strive for excellence together, instead of working individually and alone. (S2T1)
>
> We stress on overall performance, rather than individual differences. The Principal is interested in knowing what the English performance of students in a whole grade is when compared to other schools. (S3T2)

Commonly, school leaders always stress the great importance of teacher collaboration and they put much effort to back up such practices. Strategies adopted by school leaders include the principals involving themselves in teachers' instructional meetings (S5T1) and soliciting external resources to promote teachers' continuous professional and collective learning (S4T1).

However, in some instance, the administrative requirements for teacher collaboration may cause some negative effects on the practices of PLCs. For instance, teachers may stress the ends more than the means, and focus only on how to get the same results rather than involving in genuine and in-depth dialogues. Thus, it will result in the problems of conformity and superficiality:

Table 3 Means, SD, and reliability coefficients of the subscales of the PLC questionnaire

Subscale	Valid *N*	No. of item	α	Mean	SD
Collaborative learning	174	9	0.86	4.69	0.77
Professional competency	173	8	0.71	5.07	0.52
Facilitative leadership	171	9	0.92	4.51	0.98
Structural support	175	7	0.83	4.91	0.76
Cultural barriers	174	6	0.70	2.44	0.83

> Because we always discuss together and require the sameness, now our teaching styles are quite alike, so are our ways of thinking. (S1T1)
> During the process of collective lesson planning, we always only emphasize the results and teaching objectives. As to how to achieve such objectives, there are no in-depth discussions. (S6T1)

Without deep and meaningful interactions among teachers, teacher collaboration may operate at a superficial level, which is not beneficial for the development of PLCs within the schools.

Second, the traditional Chinese culture which stresses collectivism rather than individualism has a far-reaching impact on the practices of PLCs. To some extent, Chinese teachers can work together easily due to collectivism, which would facilitate the formation and development of PLCs. The following are some examples of the good sides of the Chinese collective culture:

> I think the collective culture is very important to our work. We are not just independent. If there are some good ideas or materials, we would share with each other. (S3T2)
> In practice, we work together a lot in teaching preparation and producing teaching aids, and we enjoy working together very much. (S1T2)

The above quotes show that Chinese teachers are very comfortable to collective work. In some sense, these cultural features accord with the institutional requirement for collaboration, which further contributes to the development of PLCs.

The qualitative findings, such as the quotes above, match with the findings of low scores in the subscale of cultural barriers in the quantitative survey. There is a prevailing traditional culture that most teachers emphasize on respect and harmony, which is conductive to mutual sharing and support. These findings are commonly seen in the perceptions of almost all teachers:

> Interpersonal relationship in our school is relatively easy and comfortable. The level of sharing in many areas is quite high. (S4T2)
> The atmosphere is aspirant, and also harmonious. If there is something in urgent and to be accomplished with difficulties, everyone will pull together to get it done. (S1T1)

Thus, in the negative sense, cultural obstacles such as unwillingness to share, support, or collaborate rarely exist. This results in a low level of cultural barriers.

However, the traditional Chinese culture of collectivism may create some negative impacts on PLCs. For example, too much emphasis on harmonious relationship, conflict prevention, as well as respecting others (especially the authority and the elderly) may lead to conservatism and hinder the development of PLCs. The following are some examples of the hindrance:

> Given that they (older teachers) are more experienced, I am more reluctant to propose my new ideas. I feel a little weird. (S6T2)
> When critiquing teaching performance during open lessons, we mainly touch on merits, rather than weaknesses. You know, this is the Chinese culture. (S7T1)

When teachers focus on maintaining collegial relationship without truly engaging in collaboration, there will just be a unified voice without diversified and conflicting views. Hence, it is unconducive to enhancing teaching practice through joint negotiation of meaning.

Third, in the recognition of teachers' contribution to schools or the improvement of PLCs, school leaders always focus on their performance in professional competence as well as collaborative learning. Thus, teachers' extents in professional competency and collaborative learning are selectively assessed in the virtue of teacher recognition. Such emphases by school leaders also explain largely why Chinese teachers enthusiastically participate in the various PLC activities. Interview data indicates that most teachers highly appreciate collaborative activities:

> Each time when I participate in open class observations, I feel just like getting a treasure. (S1T2)
> Actually, many young teachers develop through these class observations and reflective practice. They have made great progress. (S3T1)

This kind of recognition is rooted in the traditional social cognition that collectivity helps to enhance individual achievement. Thus, high recognition for teacher collaboration is reinforced with the traditional culture, and teacher collaboration plays a key role in the development of PLCs.

Owing to high degree of recognition for working together, collaborative learning has already become a routine in Chinese teachers' lives. It is highly valued that teachers work together in almost every aspect of their school lives:

> We have to collaborate among each other, because one's teaching effectiveness is limited. If several teachers come together and learn from each other, everyone will be benefited. (S2T1)
> Intellectual exchanges in the offices are omnipresent. (S7T1)

The collective inquiry activities accompanied by shared practices are very commonplace in Chinese schools,

Table 4 Comparison of characteristics of PLCs between this study and the literature

Characteristics	Hypothetical subscales of PLCs based on literature	Explored subscales of PLCs in this study
Individual level	Shared vision and values, collective learning, shared personal practice	Collaborative learning, professional competency
Organizational level	Shared and supportive leadership, supportive conditions	Facilitative leadership, structural Support, cultural barriers

although the specific form of PLCs may differ from school to school. This is a strong culture of high recognition for teacher collaboration in general sense in Shanghai schools.

Discussions

This mixed-method study explores the characteristics of PLCs in Shanghai schools through a quantitative survey and follow-up qualitative interviews.

Initially, we compared the quantitative findings from this study with the original hypothetical framework that generated from the literature. We have found that PLCs in Chinese schools have their own distinctive features in some areas, when comparing to the characteristics of PLCs from the literature, as illustrated in Table 4.

Table 4 shows that at the individual level, there are three variables in the hypothetical framework, among which collective learning is highly correlated with shared personal practice, as Hipp and Huffman's (2010) research indicates. While this association between collective learning and shared personal practice is much stronger in the Chinese context, since the items in the two hypothetical subscales continuously interact with each other and the line between them is blurred. Therefore, for the Chinese PLCs, the process of collective learning and shared practice merge together and thus combine into one variable to form the new subscale, *collaborative learning* in the finalized framework of this study. Professional competency in the Chinese context not only refers to shared visions and values, but also covers other professional qualities of teachers, such as their expertise, attitudes and abilities. Thus, it is a comprehensive concept in terms of teacher professionalism, since Chinese teachers commonly regard collaborative learning as daily routines (Wong 2010) and they would achieve professional development through collaborative activities in PLCs. It means that teacher professionalism in Chinese schools is largely shaped by PLCs (Wang 2008).

At the organizational level, the subscales of PLCs in Chinese schools contain similar dimensions of leadership and supportive conditions as that in the hypothetical framework, but they have some minor differences. As far as the leadership style is concerned, school leaders in Chinese schools are less distributed but more hierarchical and bureaucratic (Wong 2005), yet they are also strongly supportive in developing PLCs and play key roles in shared practices. Thus, we name the subscale of such practice as *facilitative leadership*, without the meaning of "shared leadership". With regard to supportive conditions, supportive structures and supportive cultures are two different concepts but they are originally integrated as one dimension in the hypothetical framework. In the exploratory factor analysis, we find that structural support and cultural support are two separated concepts in the teachers' perceptions of the Chinese PLCs. In term of cultural features, we have confirmed a negative subscale of *cultural barriers* in the Chinese PLCs in this study.

From the qualitative findings of our study, we have demonstrated that the five subscales of PLCs identified in Shanghai schools are further shaped by institutional, cultural and cognitive factors in the Chinese context. Firstly, due to the requirements of educational policy on the formation of a "Teaching Research System" throughout China, various teacher groups such as Teaching Research Groups have been flourishing for decades. These TRGs form the backbone of PLCs in Chinese schools (Tsui and Wong 2009). As some researchers pointed out, when compared to the US where the institutional barriers are pervasive, Chinese schools have advantages in terms of time, space and institutional incentives for PLCs (Sargent and Hannum 2009). Because of such a policy, school leaders in Chinese schools pay more attention to teachers' collective achievement and collaborative learning than those in Western schools. These features are the important facilitators to the development of Chinese PLCs.

Second, although part of the traditional Chinese cultures such as respecting for the elderly and avoiding conflicts may be some barriers for the development of PLCs, the -social culture which stresses collectivism is generally advantageous to PLC practice. For Chinese teachers, collective activities and shared practices are culturally acceptable (Tan 2013), and they have become quite accustomed to these collaborative activities. Thus, due to the cultural traits, collaborative learning is quite commonplace in Chinese schools and the cultural barriers to the development of PLCs in Chinese schools are relatively low.

Third, high recognition for teacher collaboration has key effects on teachers' professional competency and collaborative learning. Unlike Western culture which emphasizes

individual rights and assumes that "collectivity reduces the role of the individual" (Paine and Ma 1993), Chinese teachers see no conflicts between collectivity and individual agency, and they believe that collaborating with colleagues helps to improve their teaching effectiveness. This culture renders collaborative activities easy in a large sense in most Chinese schools. Furthermore, since Chinese teachers attribute credits to collective learning for achieving professional growth, they tend to devote high level of energy to collective inquiry (Ryan et al. 2009). Thus, most Chinese teachers regard that participating in PLC practices is an effective way of enhancing professional competency.

In this study, most findings confirm that the school education system and the traditional culture in the Chinese context will bring benefits for the development of PLCs in Shanghai schools. However, these institutional and cultural factors also bring hindrance to PLC practices, such as superficial collaboration among colleagues and high emphasis on results rather than processes, which will have to be addressed, if the development of PLCs in Chinese schools is further enhanced.

Conclusions and Implications

This study explored the characteristics of PLCs in Chinese schools with Shanghai as an example. The authors find that Chinese PLCs can be operationalized in terms of collaborative learning, professional competency, facilitative leadership, structural support, and cultural barriers, which are considered as the basic characteristics of Chinese PLCs. Compared to the hypothetical framework for PLCs based on literature review, Chinese PLCs have their own features. It mainly results from the influence of institutional, cultural, and cognitive factors within the Chinese context. This study not only enriches the existing literatures on PLCs by providing and analyzing Chinese experiences, but also demonstrates Wenger's theory of PLCs' context specificity. This study also adds to our previous understanding that building up PLCs is a time-demanding process with non-negligible barriers, especially those obstacles featured in specific contexts.

The study has the following implications for the practices of PLCs in China. First, it is crucial to address to the cultural barriers, especially those negative cultural traditions such as respecting the authority and conflict prevention which result in unfavorable interpersonal relations and superficial collaborative cultures. School leaders could provide incentives to encourage different views of teachers, and facilitators of PLCs should be trained to guide teacher exchanges toward deeper and meaningful dialogues (Hord 1997). Thus, a kind of authentic shared and collaborative culture in the Chinese schools can be established. Second, school institutional structures should be further optimized to promote the sustainable development of PLCs. As this study indicates that contrived collegiality may lead to conformity and superficiality, thus meaningful dialogues in PLCs are unavailable (Hargreaves1994). Therefore, more power and responsibility should be given to teachers to carry out collective learning activities based on their own will and needs. Fostering informal and spontaneous collaborations among teachers may also be helpful.

Readers should be reminded of the limitation of this study. The sample size of the quantitative research is comparatively small. Further, although Shanghai schools share the same educational and institutional features with schools in other parts of China, findings from this study may not be generalized to the great population of schools in China, where there is great diversity between schools in the eastern and western parts, between the urban and rural areas, and so forth. More studies, by extending the present framework for Chinese PLCs, with greater sample sizes and samples from various contexts, should be carried out in order to further verify the findings of this study. In addition, more studies on the context specificity of PLCs in various settings should be conducted in order to provide valuable suggestions to the development of PLCs globally.

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