

Original article

The relationship between the development of professional learning communities (PLCs) and the building of teacher professional capital: A case study in an undeveloped area of China

Qi Xiu, Yaqiong Chen^{✉*}

College of Teacher Education, South China Normal University, Guangzhou 510631, China

Cited as:

Xiu, Q., & Chen, Y. Q. (2026). The relationship between the development of professional learning communities (PLCs) and the building of teacher professional capital: A case study in an undeveloped area of China. *Education and Lifelong Development Research*, 3(2): 104-118. <https://doi.org/10.46690/elder.2026.02.05>

Teachers play a crucial role in school reform and students' learning. Therefore, the improvement of teaching quality has been a topic of much study. This article aims to explore the relationship between the development of professional learning communities (PLCs) and the building of teacher professional capital in an undeveloped area of China. A case study was conducted at a high school known for student success on the College Entrance Examination (gao kao). The data analysis shows that the characteristics of the PLCs at this school include school vision, school support, shared leadership, scientific evaluation standards, a culture of trust and respect, collective responsibility, information and resource sharing, continuous interactions, and individual practice and reflection. Positive factors related to psychological capital also made a great difference in the development of these PLCs and in the building of teachers' professional capital within the school.

1. Introduction

Due to the strong performance of Chinese students on international assessments such as the Organization for Economic Co-operation and Development (OECD) Program for International Student Assessment (PISA), a large number of scholars have sought to discover the key to China's educational success. However, the results of these kinds of assessments do not represent the academic level of all Chinese students. While only students from Shanghai, one of the most advanced cities in China in terms of education, are selected to take part in PISA, students in small and medium cities account for a large proportion of the total student population. With the develop-

ment of Chinese urbanization, more and more rural students are choosing to move cities to receive a better education. It is well recognized that the development of education in small and medium cities will make a great difference to the development of Chinese education as a whole (Guo et al., 2019). Therefore, the study of schools in these smaller cities is essential to understanding the basic situation of Chinese education.

Teachers play a crucial role in school development. Much evidence has shown that teacher professional development has a great influence on various school characteristics, including student academic performance and school-parent collaboration (Timperley et al., 2008). In the largest Chinese cities, such as Beijing, Shanghai, and Shenzhen, teaching is a highly

desirable career. A great number of university graduates, not only from teacher training universities but also from the top comprehensive universities, believe that a teaching career is one of their best options due to the Chinese mindset of Zhongyong. Teaching represents stability; teachers are not likely to lose their job without just cause. In addition, due to the principles of Confucianism, teachers are well respected by society. Therefore, many high-quality graduates, with both bachelor's degrees and graduate degrees, strive to become teachers in the first-tier cities in China. In contrast to highly developed cities, smaller cities do not have the capacity to attract top graduates for various reasons, including low salaries and insufficient educational resources (Zhang et al., 2025). Despite this unfavorable situation, some schools in less developed cities still attain impressive achievements in the College Entrance Examination (gao kao). Teacher professional development has been suggested as a key contributor to student performance (Wei, 2021); thus, it is valuable to explore the process through which professional development is promoted in schools in undeveloped cities in China to help elucidate the reasons behind student success.

This article will explore how professional learning communities can be built in schools in China's undeveloped cities from the perspective of the improvement of teacher professional capital. It will also look at the Chinese experience of building PLCs through a western theoretical lens in order to shed light on quality improvement in education for other cities around the world through promoting PLC development and teachers' professional capital building.

2. Literature review

2.1 Teacher professional learning communities (PLCs) in the international literature

Teacher professional learning communities (PLCs) have sparked a wide-ranging discussion on a global scale. Cultivating PLCs is regarded as one of the most efficient ways to promote teacher professional development, student academic achievement, and school reform (Stoll et al., 2006) and is related to broader benefits such as community learning and lifelong learning (Vanblaere & Devos, 2016; Bai et al., 2026).

Professional learning communities were first suggested by Shirley Hord in 1998 (Hord, 1998). She defined PLCs as teachers' communal exploration of improving their teaching practice and taking responsibility for student success. Following this, Richard DuFour and Mike Schmoker further conceptualized PLCs (Brown et al., 2018), defining them as alliances of individuals with a common interest in education (DuFour, 2004), which can include everything from grade-level teaching teams to national professional organizations. However, this definition did not elaborate on collaborative learning and also neglected accountability, which are regarded as the keys to successful PLCs (Hoaglund et al., 2014). Later on, Hoaglund et al. (2014) further defined a PLC as a learning group comprised of committed teachers who work collaboratively in order to promote student learning, and Hargreaves suggested that the core feature of PLCs is working together to improve students' academic performance

(Hargreaves, 2019). In conclusion, it can be seen that PLCs are more than just a type of teacher cooperation; they also include the school's culture, vision, and mission, as well as the shared goal of improving students' academic achievement (Lomos et al., 2011; Vangrieken et al., 2017). Indeed, a wide body of research has demonstrated that the creation of PLCs has a significant relationship with students' academic results (Lomos et al., 2011).

However, not all of the perspectives on PLCs have been positive. For example, Hairon & Dimmock (2012) pointed out that PLC development can result in problems such as a heavy workload for teachers, overly hierarchical systems, varying degrees of willingness to cooperate among group members, non-uniform evaluation approaches, and a lack of organizational trust (Hairon & Dimmock, 2012; Harris & Jones, 2010; Qian & Allan, 2020).

Five key characteristics of PLCs were identified by Hord (2004) and Louis et al. (1995). These comprise the following:

Shared values and vision: This refers to the values of the staff and leaders as well as the norms of behavior they support. These can be used to guide teachers and school leaders to make decisions about teaching and learning in the school.

Shared and supportive leadership: DuFour (2003) argued that cultivating teacher leadership and promoting teacher participation in school decision-making processes have been shown to have a positive effect on the functioning of PLCs. Efforts by the principal to cultivate a collaborative school culture (Murphy, 2015) and support staff with outside resources can also promote the development of PLCs.

Shared personal practice: This refers to activities such as peer observations and open-door lessons (Lindahl, 2010). It has been reported that shared personal practice will contribute to PLCs through the disclosure of successes and failures, allowing teachers to learn from one another and create close relationships. However, such activities also face challenges, such as time limitations (Hord, 1998) and superficial discussions (Carpenter, 2018).

Collective learning and application: This is the most crucial element of PLC development.

By taking part in joint activities and exchanging teaching materials (Salleh, 2016; Olivier & Huffman, 2016), teachers collaborate to promote students' academic performance beyond their classrooms.

Supportive conditions: The support necessary for PLCs includes logistical and personal support. Logistical considerations such as school size, well-developed communication structures, and a time and place to meet regularly are all important for the development of PLCs. The characteristics of personal support are more complex. Cultivating trust and respect among colleagues is significant, as it will promote teachers' relationships, collaboration, and willingness to engage in constructive conversations and give feedback. Trust and respect also help PLC members to establish norms of continuous critical inquiry and improvement (Boyd, 1992).

These five characteristics have been well acknowledged theoretically and implemented in different educational contexts in practice (Hord et al., 2010). In the past decade, research on

the development of Chinese PLCs has been increasing (Qian & Allan, 2020); however, most studies have focused on describing PLC development in China's largest cities, especially in Shanghai, because of the successful academic performance of urban students (Hairon & Tan, 2017; Wong, 2010). Little research has focused on PLC development in China's undeveloped areas, although this could shed light on the bigger picture of PLC development throughout the country.

2.2 PLCs in China

The development of Chinese teacher professional learning communities has a long history. In China, PLCs exist against a background of school-based teaching research, and the most common format of Chinese PLCs is subject teaching research groups (TRGs or jiaoyanzu) (Chen, 2020; Hairon & Tan, 2017; Qian & Allan, 2020; Zhang & Wong, 2018). Although the PLC as a broader concept has not been widely used in the Chinese context, it is commonly thought that TRGs have adopted the critical characteristics of PLCs, including shared vision, collective responsibility, and a collaborative culture among group members. These groups are regarded as the most commonly used and an efficient way to promote teacher quality and student academic performance (Chen, 2020; Zhang & Pang, 2016). However, there are some differences between Chinese and western PLCs. Chinese TRGs often use model teachers and model classes, while PLCs in the western context incorporate a diversity of perspectives (Qiao et al., 2018). The development of PLCs in China has faced specific challenges (Qian & Allan, 2020; Yin et al., 2019; Zhang & Pang, 2016; Zhang et al., 2017). Due to the traditional culture of China, built on stratification and deference, it is common for PLC group members to fall into the trap of respecting authority rather than sharing their own knowledge. Chinese teachers in PLCs are often unwilling to express their real views to their colleagues, especially when those colleagues are senior leaders (Qian & Allan, 2020). This leads to a 'superficial' collaboration culture in Chinese TRGs, compromising teacher professional learning (Zhang et al., 2017). Several articles have discussed the problems related to Chinese PLCs; however, the questions of how to ensure authentic collaboration and how PLCs really make sense in China have yet to be fully addressed.

2.3 Teacher professional capital

Capital has been used in the financial arena to describe accrued money and wealth. Two elements are included in the concept of capital. On the one hand, it refers to the surplus value created and taken by the capitalist; on the other hand, it symbolizes an investment on the part of capitalists with expected rewards in the market (Lin, 1999). Transcending the business world, Pierre Bourdieu (2018) suggested that capital also takes non-economic forms, such as cultural capital, social capital, and symbolic capital. Building on Bourdieu, Hargreaves & Fullan (2012) defined capital within the educational area as "an asset that has to be invested, accumulated, and circulated to yield continuous growth and strong returns." According to the authors, in order to promote economic

productivity and social cohesion for the next generation, a long-term investment in developing human capital from a young age is necessary. High-quality teachers and teaching are the main elements of this investment. Students need teachers who are "highly committed, thoroughly prepared, continuously developed, properly paid, well networked with each other to maximize their own improvement, and able to make effective judgment using all their capabilities and experience" (Hargreaves & Fullan, 2012, p.3). This can be achieved through cultivating teachers' professional capital. Professional capital comprises three components: human capital, social capital, and decisional capital.

Human capital refers to individual talent, especially individuals' professional capacity (Hargreaves & Fullan, 2012). Human capital, in an educational context, "is about knowing your subject and knowing how to teach it" as well as "knowing children and understanding how they learn" (Hargreaves & Fullan, 2012). As a teacher, the development of human capital involves instilling students with the requisite knowledge and skills. Moreover, teachers must understand how their students learn and must be able to employ creative and effective practices in their teaching. This complex process of development of human capital can benefit from the power of team cooperation (Hargreaves & Fullan, 2012). Dedicated professional learning helps teachers to acquire teaching knowledge and skills that have the potential to promote students' academic performance (Ratts et al., 2015).

Social capital usually refers to an investment in social relations with expected returns (Lin, 1999). In order to produce profits, individuals join various associations and networks. This promotes both information exchange and resource production (Lin, 1999; Lin & Erickson, 2008). In the educational context, it refers to the collaborative power of the instructional group, which will produce higher quality teaching. Social capital emphasizes the significance of networks, reciprocity standards, and trust among teachers (Hargreaves & Fullan, 2013). High social capital usually predicts positive academic performance (Daly et al., 2014; Leana, 2011; Pil & Leana, 2009). Strong relations among teachers within the same learning group facilitates the rich exchange of resources and ideas. Teachers' human capital can be improved as well through building social capital (Hargreaves & Fullan, 2012).

Decisional capital refers to teachers' capacity to make strong decisions when there is no fixed rule to guide them or when they encounter situations they have never experienced (Hargreaves & Fullan, 2012). Reflection and practical judgement are the foundation of a professional action (Nolan & Molla, 2017). Teacher confidence is a symbol of professional judgement; it is defined as "the ability of the teachers to be self-organizing, self-reflective, self-regulating, and proactive in their behavior" (Bray-Clark & Bates, 2003, p.14). The degree of empowerment, voice, and autonomy teachers have in professional practice can be defined as decisional capital. When teachers and teacher leaders analyze lessons and daily teaching practices, their capacity to make decisions will be improved.

These three main elements of professional capital can coexist in various arrangements. The vast body of research on

professional learning communities establishes social capital as the most important factor in improving student outcomes and places human capital and decisional capital in a supporting role (DuFour, 2008; DuFour & Reeves, 2016). However, some scholars suggest that teachers should focus on academic content, believing human capital to be the most essential element, while others claim that decisional capital is crucial for teachers' professional development. The ranking of human, social, and decisional capital was not prescribed by Hargreaves and Fullan; however, they did emphasize that any strategy that ignored one or two of these three elements would be ineffective (Shirley, 2016).

It is well recognized that teacher professional capital building can be a useful way to conceptualize the complex work of teaching (Hargreaves & Fullan, 2015), it is also subject to several criticisms and limitations. One of the key criticisms of the teacher professional capital is that it can be overly individualistic, and fail to account for the broader system factors that influence teaching and learning (Tong & Razniak, 2017). For example, the school background, students' academic performance or the opportunity the teachers have to develop their professional ability. These systematic factors are often beyond the control of individual teachers but may have a significant impact on their teaching effectiveness. Additionally, the notion of teacher professional capital has the opportunity to reinforce existing power structures and inequalities within educational settings (Chapman et al., 2016). Teachers who possess more professional capital may be more likely to be recognized and rewarded within their institutions, while those who lack such this capital may struggle to advance in their careers. This can lead to a situation where teachers with more professional capital are able to acquire more and more, while those without the capital fall further behind. Therefore, the consideration of how teachers' professional capital can be cultivated in the context of PLCs is essential to improve the capital of the whole institution.

2.4 The relationship between teacher professional learning communities and teacher professional capital

Little research has focused on the relationship between PLCs and the development of teacher professional capital. However, based on studies in other contexts, it can be seen that there is a positive relationship between the two concepts.

In a qualitative study conducted in Taiwan, China that included interviews with five teachers, observations, and document analysis, Tan (2018) reported that social capital is the key element that is cultivated during the process of PLC development, while human capital and decisional capital are fostered through the strengthening of trust amongst PLC members. Walker (2017), using survey-based research, found that in the process of professional learning, teachers come to understand the concept of professional capital and to believe that collaboration and joint work are crucial in their daily practice. Walker (2017) found that the improvement of teachers' professional capital is related to eight themes in teachers' daily practice: relevant professional development, self-directed

learning, trust, freedom of expression, professional and personal relationships, dictated/scripted autonomy, commitment, and triadic capital connections. According to Walker (2017), the most efficient way for schools to promote professional capital building is to invest in the school culture and guide teachers away from teaching in isolation. In Canada, based on an analysis of the Saskatchewan Professional Development Unit (SPDU) facilitator community, Osmond-Johnson (2017) reported that the development of teacher-led PLCs helped teachers in these communities build professional capital. PLCs buttressed teachers' leadership roles by building their confidence and expanding their knowledge of instructional strategies.

Research on the relationship between PLC development and professional capital building has been rare in mainland China, especially studies focusing on the undeveloped areas of China. This research attempts to explore this relationship and poses **two main questions** to be addressed: What are the characteristics of PLCs in schools in underdeveloped cities in China, and how do these PLCs promote the building of professional capital in such schools?

3. Research method

3.1 School context

The school under study (H high school, a pseudonym) is located in an undeveloped city in the central area of China, which is also called H in this research. H high school is famous throughout China due to the extremely strong performance of its students on the College Entrance Examination (gao kao). Compared with the largest cities in China, H City does not demonstrate outstanding performance in either economic or cultural development. The per capita GDP of this city is below the average level in China. Against this background, there are not sufficient resources for the students in this city to receive the same level of education as that received in first-tier cities in China. As for the teacher resources in H high school, due to its undeveloped economic status, the quality of the teachers in H high school could be considered lower than that of the teachers in the largest cities. Almost all of this school's novice teachers are college graduates who originated from H City. However, despite this disadvantaged situation, the performance of the students at H high school has attracted attention from all around the country, and a large number of professionals from other schools and educational institutions have visited H high school to explore the reasons behind its success. In this study, H high school is considered as a whole-school PLC; the teaching and research structure is delineated below (Fig. 1). As shown in Fig. 1, the principal distributes the power to the management team, and there are two main departments working together to promote teacher professional development within the school: the office of academic affairs and the teacher professional development center. The teaching coaches (jiaoyanyuan) from the Education Bureau also play an important role in improving teachers' professional performance. Teachers polish their teaching skills through individual practice, master-apprentice mechanisms, and routine discussions in subject teaching and research groups.

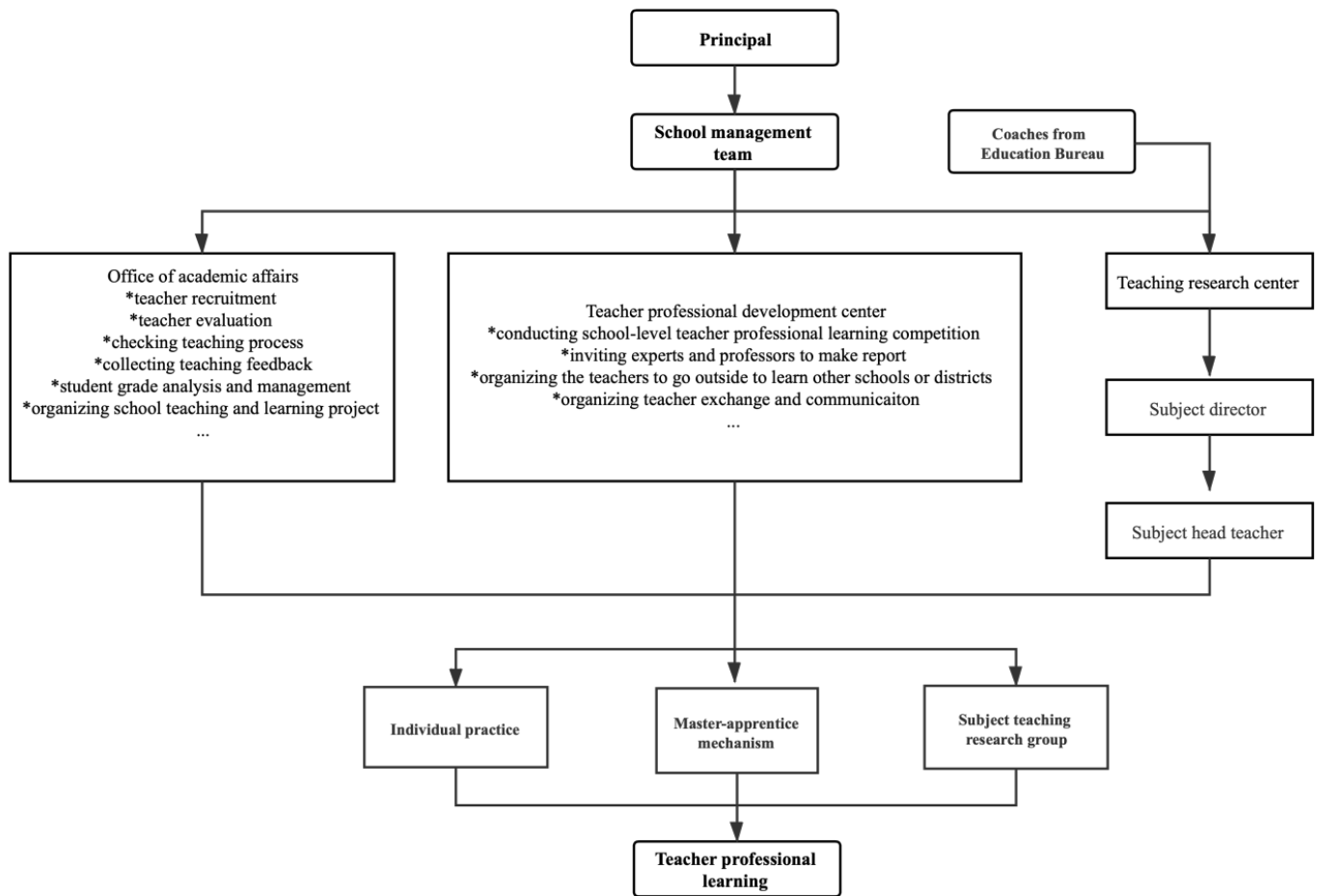


Fig. 1. Teaching and research structure in H high school.

3.2 Research method

This study uses the qualitative research methodology of a case study (Yin, 2006). As a method to help “answer how and why questions” (Yin, 2009), a case study is suitable for this research as it allows the exploration of how PLCs affect teachers’ professional capital building. In order to collect data, the school principal’s public interviews and reports, semi-structured interviews with school leaders and teachers, observations, and some related teacher professional development documents were used (DiCicco-Bloom & Crabtree, 2006).

3.3 Sample

Thirteen teachers and school leaders were selected to take part in the research and were asked to join the individual semi-structured interviews. Two of the participants were recommended by the principal of H high school. For the selection of the other participants, a snowball sampling method was used. The two teachers who were recommended by the principal introduced other teachers for participation in our project. Meanwhile, participants were selected randomly from the office where the researchers were conducting observations. The demographic information of the study participants is listed in Table 1. Nine female teachers and four male teachers

participated in our interview. All of the teachers had a bachelor’s degree, and their years of teaching experience ranged from 1–24 years. The sample teachers covered eight subjects, and they filled roles as teachers, teacher leaders, and school management members. The ethical information related to this study was discussed with the participants in advance, and they understood that their personal information and the information they shared in the interviews would be strictly protected. Most teachers allowed us to record their interviews; however, one of the teachers did not want to be recorded, so the interviewer took handwritten notes, attempting to record the conversation as completely as possible. The participants were informed that the interview material would be used in research data analysis, and all of the participants provided written consent.

3.4 Data collection

We were previously acquainted with the principal of H high school as a result of a nation-wide principal training activity and were able to conduct a one-on-one interview. Moreover, we reviewed the public reports and other public interviews given by the principal of H high school at the Chinese National Middle School Principal Training Center. In order to explore the success of H high school, we worked

Table 1. Basic information of participating teachers (N=13).

Code	Sex	Degree received	Years of teaching experience	Subject	Position
HT1	F	Bachelor's	6	Physics	Class head teacher
HT2	F	Bachelor's	10	Chemistry	Subject head teacher
HT3	M	Bachelor's	17	Math	Subject head teacher
HT4	F	Bachelor's	9	Math	Subject head teacher
HT5	F	Bachelor's	6	Math	Teacher
HT6	M	Bachelor's	7	Physics	Teacher
HT7	F	Bachelor's	12	Geography	Subject head teacher
HT8	F	Bachelor's	11	Chinese	Deputy director of teacher professional development center
HT9	F	Bachelor's	10	English	Subject head teacher
HT10	F	Bachelor's	17	Physics	Teacher
HT11	M	Bachelor's	13	History	Teacher
HT12	F	Bachelor's	1	Politics	Teacher
HT13	M	Bachelor's	24	Principal	—

within the school for one month (from 8th October to 10th November, 2020) to become familiar with the context and conduct interviews with teachers (n=5), teacher leaders (n=6), and school administrators (n=2). Interviews were 45 minutes to 90 minutes in length. The interviews were audio recorded, and we also took handwritten notes. The sample questions included “What kind of collective activities are usually part of your daily work?”; “Could you please describe the process of your collective teaching and research activities?”; “Do you think your professional ability has been improved through the collective activities? From what perspective?”, etc.

Meanwhile, we also obtained documents on teacher professional development at H high school, including the management and implications of school-based teaching research at the school, as well as the assessment standards for excellent teachers, excellent subject groups, and excellent masters and apprentices (shi tu zhi). The teachers' class preparation notes were also collected. While at the school, we observed the classrooms, the teachers' offices, team teaching research meetings, school-wide teacher training meetings, mentor coaching, and other related activities to facilitate triangulation (Patton, 2002). During this process, observation notes were created.

3.5 Coding and analysis

The data include eight official documents, 13 semi-structured interview records, and nine observation notes. All of the data were transcribed, and MAXQDA was used to code and organize the data. A two-step qualitative analysis procedure was used in this research. In the first step, the deductive coding method was followed; the inductive (open) coding method was used in the second round. The initial coding structure was guided by a framework based on the

characteristics of PLCs (Hord, 2004) and the main elements of professional capital (Hargreaves & Fullan, 2015). We coded all of the sources according to the five dimensions, while remaining open to additional dimensions that did not appear in Hord (2004) and Hargreaves & Fullan (2015)'s work. Then, secondary coding was used to tease out the themes to reveal a more nuanced picture of how the characteristics of PLCs affected professional capital building. A total of 416 codes were generated in this process. The data were coded into 65 categories based on PLC theory and professional capital theory. The official documents and observation notes were used to validate the interview data.

Both researchers took part in collecting and coding the data in order to ensure reliability. In the process of coding, any doubts regarding comprehension of the data resulted in reference to handwritten notes to double-check the information; if there were still uncertainties, the interviewees were contacted, and the information was confirmed.

4. Findings

4.1 The characteristics of PLC development in H high school

From the analysis of the interview data and the documents related to teacher professional development, five main strategies were uncovered: shared values and vision, collective learning and its application, shared personal practice, shared and supportive leadership, and supportive conditions.

4.1.1 Shared values and vision

The school vision encapsulates the staff's values and provides direction for building norms of teacher behavior (Hord, 1998). Principals play a pivotal role in the process of

building a shared vision in a school (Qian & Allan, 2020). In H high school, the principal was a strong motivating force for the teachers. Not only did the principal express the mission of the school clearly to the teachers and other school staff and repeat these themes daily (from HT13), he also played an exemplary role in supporting the students, focusing on performance, hard work, and being willing to make sacrifices (HT3; HT4; HT5; HT6; HT8). In our observations at H high school, we noted the teachers' clear motivation to devote themselves to their students and focus on their achievements. One of the reasons most frequently mentioned by the teachers for this culture of devotion was the influence of the principal. The principal held meetings for the teacher leaders and other teachers regularly and updated them on the school's progress and future plans. In the meetings, teachers were praised and rewarded. "Everyone wants to be praised in the meeting; this is my motivation to work hard," one of the young teachers mentioned (HT5). Another interviewee also spoke of the shared values and vision at the school:

I can find a clear goal in my work; it is not to get high scores, it is how to make my students become better people...I need to give them correct values...I feel lucky to stay in such a good school; all of the teachers around me devote themselves without complaint at all. I believe the students can be affected by these good values. (HT8)

The principal as a role model and the environment cultivated by their leader motivated the teachers to work hard to support the shared values of the institution.

4.1.2 Collective learning and its application

Collective learning and its application are regarded as the core characteristic of PLC development. There were many formats for collective learning at H high school. As Fig. 2 shows, collective learning in the school happened on three levels: the subject group level, the grade level, and the school level.

Teaching research was frequently used in H high school. The most common platform for collective learning for regular teachers was the subject TRG (*xueke jiaoyan zu*). Subject TRG activities included class preparation, setting of teaching goals, teaching progress discussions, drawing up supplementary teaching materials, analysis and summary of students' academic performance, and weekly teacher performance assessments. In order to ensure that every teacher had high-quality classes for their students, a "one lesson, three times" research mechanism (*yi ke san yan*) was applied in H high school (See Fig. 3). A systematic review of the teaching activities and teacher performance was conducted by the subject teachers. Novice teachers usually gave feedback on how the lesson had gone and asked questions. The members of the TRG held discussions and tried to improve their teaching through this kind of review and interaction. Another main strategy for promoting teacher professional learning at H high school was its open-door class policy. This meant that every class in the school was public. Novice teachers could go into experienced teachers' classes any time if they wanted to observe; conversely, if a subject head teacher wanted to see how the novice teachers were performing in class, he/she could

walk into the novice teachers' classes without prior notice. According to the teachers in this study, all of the teachers in H high school could also access other teachers' classes through the class monitoring cameras. Therefore, the teachers sought to ensure that all classes were taught with a high standard.

As for grade-level teaching research activities, the subject head teachers met regularly. Subject directors also took part in these gatherings to make sure that the spirit of school-level teaching research meetings could be delivered to the subject head teachers and then spread to the various teaching research groups.

At the school level, the teacher professional development center took responsibility for teachers' professional learning. According to the deputy director of the teacher professional development center at H high school, the center organized various activities for teachers in order to promote their continuous learning. These included visits to other schools and institutions, inviting experts to give feedback, school-wide teacher research training, establishing teacher assessment standards and conducting teacher assessments, and organizing subject forums (*xueke luntan*). Various activities were organized during subject forums, such as backbone teacher (teachers with proven teaching performance) reports, public class competitions, and teaching skills competitions. These activities helped novice teachers to "improve their teaching skills quickly and cultivate their ambition to become one of the best teachers in H high school" (HT8).

The establishment of TRG assessment standards was an effective way to promote collective learning in H high school. Based on the teaching research group assessment standards, teachers were evaluated as a group instead of being evaluated in isolation. Teacher assessment was tightly linked with students' academic performance. If students' grades kept falling, their teachers would be deemed to lack the quality necessary to qualify during "excellent teacher" selection. At the same time, the TRG to which these teachers belonged would be deemed not to have the quality necessary to participate as an "excellent teaching research group." Therefore, this kind of assessment model encouraged each teaching group unit to work together in the quest for better teaching quality. One teacher remarked,

In our school, there is no selfish teacher. Every teacher would like to share their teaching materials and teaching experience with other teachers. To some degree, it is because they are kind, but it is also because the teachers know that it is useless for their own teaching grade to be good when only if all the teachers perform well in teaching can they get more rewards from the school. (HT9)

Other methods were also used to promote teacher collaboration at H high school. Due to the traditionally differential culture, it can be difficult for teachers in China to express their own opinions. Most teachers, especially novice teachers, choose to keep quiet in group discussions (Zhang & Pang, 2016). To address this phenomenon, each subject TRG at H high school had its own standards for evaluating its member teachers, and these evaluation results were used to set teachers' performance-based salaries. Meanwhile, the TRGs focused on cultivating a harmonious, mutual trust and supportive environment for the teachers, to encourage them to

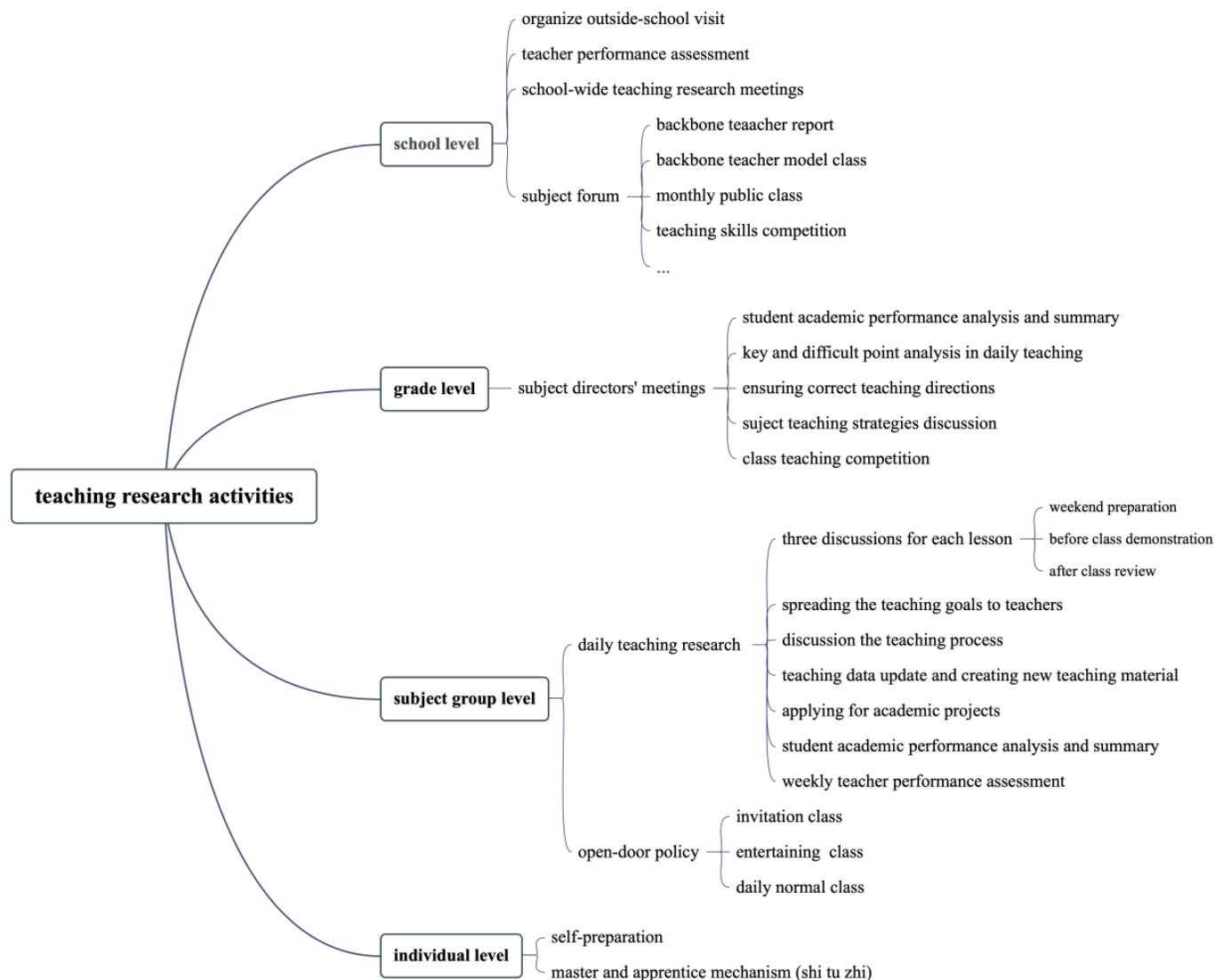


Fig. 2. The specific teaching research activities at H high school.

participate in discussions. This congenial environment did not entail the teachers merely complying with the teacher leaders or the more experienced teachers; rather, the experienced teachers wanted to hear new opinions from the novice teachers.

Nowadays, social media plays an increasingly important role in teacher collaboration. For example, at H high school, subject teachers joined WeChat groups to conduct online discussions anywhere and at any time. These groups enabled not only subject head teachers but also regular teachers to share valuable links and information with the group. Especially during the COVID-19 pandemic, the teachers relied on online research to maintain their normal teaching activities when the campus was closed and classes were moved to online platforms.

4.1.3 Shared personal practice

Although teachers spent a great deal of time on group research, they still made time to regularly review their own

practices and make individual preparations. During our observations, it was common to find novice teachers working late into the night. When we asked teachers if working overtime was compulsory at H high school, all of the teachers gave a negative answer. One of the teachers explained

In our school, there are no compulsive rules to push the teachers to work late. The teachers usually work overtime voluntarily. There are two main reasons why we leave late: one is that teachers spend a lot of time on group teaching research and team learning, so they have to squeeze in time to make self-preparations, do daily reviews, and check homework; the other reason is that there is a “spirit” in our school, a magic energy that exists around us, and this kind of energy promotes us to work hard. Maybe this kind of energy comes from the model teachers, maybe from the encouragement of the principal. I cannot explain it clearly. I just know no one wants to fall behind [in teaching] and everyone tries their best to improve their teaching capacity. (HT7)

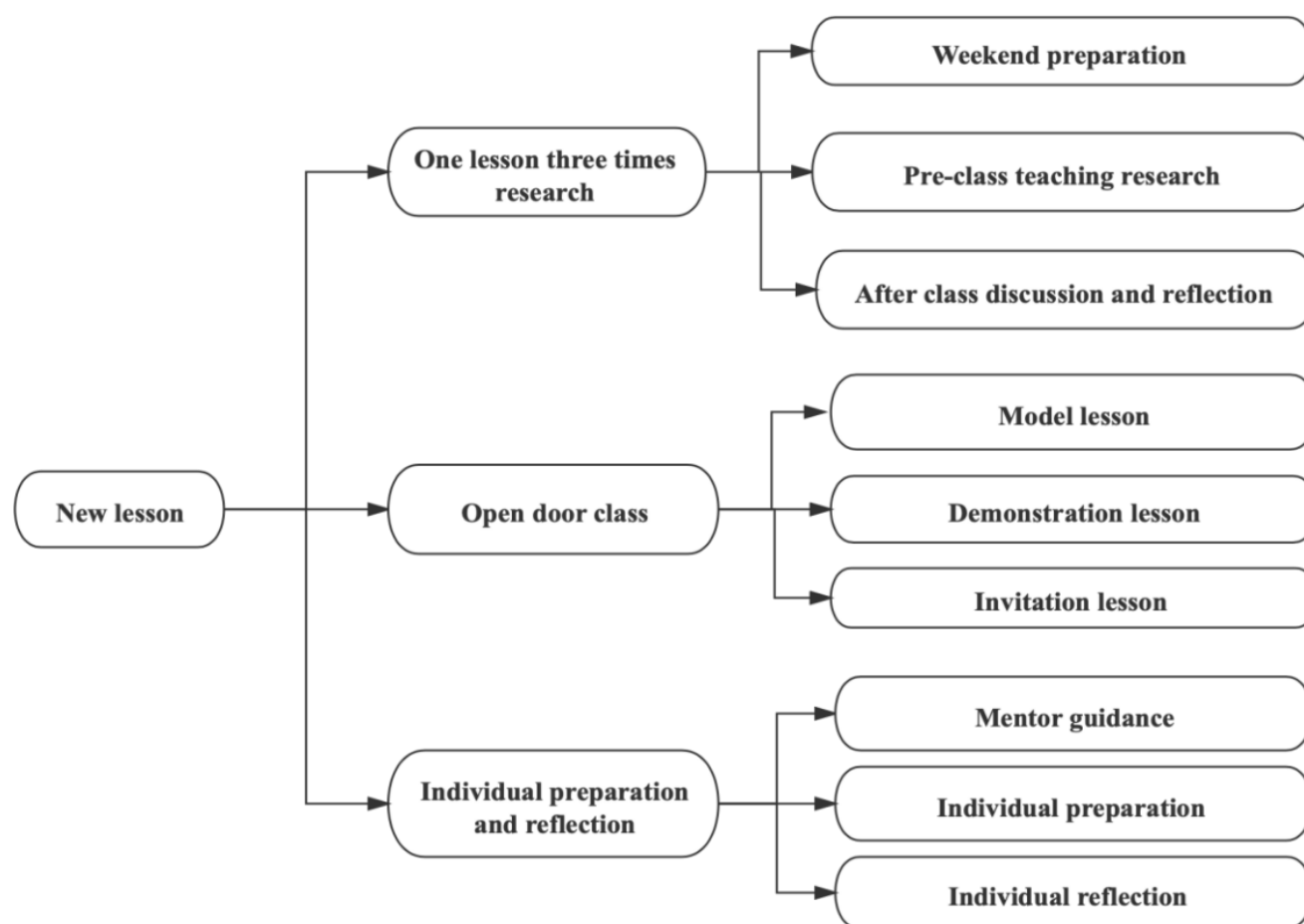


Fig. 3. The process of lesson research in the TRGs of H high school.

At the same time, the mentoring system (*shi tu zhi*) was also used help novice teachers grow into mature teachers. In H high school, a formal mentoring and apprentice pairing ceremony was held every year. Each mentor generally had two apprentices, and they were usually part of the same TRG. This meant that they met every day and interacted with each other regularly. This kind of relationship lasted for approximately two years. Almost all of the teachers who participated in the interviews expressed their appreciation for their mentors. They reported that the help they had received from these individuals had led to accelerated professional development. In H high school, the principal's aim was for novice teachers to become confident in front of a class in two years and become a mature teacher in five years. The mentors helped the novice teachers not only in terms of teaching but also emotional development.

4.1.4 Shared and supportive leadership

In terms of teacher professional learning, the TRGs played important roles. The right and responsibility to bring the teachers together and promote their professional learning was delegated to the TRG leaders. Not only did these leaders organize the daily teaching and research activities, they also

transmitted orders from higher-level leaders. They could be regarded as the “mediators” and even the “lubricant” between the school management team and the teachers. The TRG heads had strong leadership identity in H high school. One remarked, “*the reason why I can be the head teacher [of the TRG] is because of the trust from the organization. I have the responsibility to make it [the TRG] better*” (H9). Within the TRGs themselves, the approach was more collaborative. The teachers agreed that they had opportunities to participate in decisions: “*Everyone can say their opinion, and every opinion will be respected in our group*” (HT6).

However, although the functions of the principal were distributed in H high school, teachers did not have many opportunities to participate in decisions about school-level affairs. One participant noted, “*That’s the business of the leaders*” (HT5). The principal had the absolute authority to make school-related decisions without the participation of teachers. Most of the time, the teachers just accepted orders from their direct leader and executed the commands without question. The hierarchy in H high school was clear from this perspective. This structure is typical of most Chinese schools, especially those located in undeveloped areas, because of the

traditional culture of authority (Zhao et al., 2013).

4.1.5 Supportive conditions

H high school used a wide range of strategies to support teachers' professional learning. One of the most mentioned activities was a strategy called "invite in and go out" (*qing jin lai, zou chu qu*). "Invite in" meant H high school had a regular plan to invite professionals and experts to come to its campus to give feedback in the form of reports. "Go out" referred to the teachers in H high school having annual opportunities to go to schools in different cities to learn the best practices in China. Meanwhile, the principal, the vice-principal in charge of teaching, and the teacher professional development center held regular meetings to discuss teacher professional training. Teachers at H high school strongly approved of these teacher training strategies. One remarked,

I believe the teacher training in our school is scientific and helpful for teacher professional development. We can learn a lot from the experts outside that we cannot learn within the school. The regular principal meetings are also meaningful for me. Our principal is a wise person. We can learn a lot from him. We can always get energy from him. (HT5)

The proper operation of a PLC involves setting aside dedicated time for its operation. In H high school, all of the TRGs had a fixed timetable for gathering every day and every week, and the teachers were compelled to take part in these group discussions. However, as mentioned above, in order to make sure that every teacher understood their teaching content and had adequate teaching skills, the teachers spent additional personal time on professional learning and teaching research. This meant it was unavoidable for the teachers to have a high workload and to work overtime. This is common in Asian societies (Chen et al., 2018). Some interviewees complained about this. Yet, the teachers who expressed concern also said that they were willing to model hard work for their students: "This [working hard] is the culture of H high school. Once you enter this school, you have to accept it and practice that" (HT5). As a member of this school, the teachers accepted the teaching culture, whether consciously or unconsciously.

4.2 Building teacher professional capital through PLCs

4.2.1 Human capital

The interview and observation results showed that teachers' human capital can be improved through taking part in teacher professional learning communities. Almost all the teachers admitted that their subject knowledge and teaching skills had improved a great deal as a result of their daily teaching research activities. According to the teachers, there were three main resources that helped them improve their human capital: mentor coaching; team learning; and reports from experts, experienced teachers, and Education Bureau coaches (HT1; HT4; HT6; HT7; HT8; HT12). It should be noted that the mentor-apprentice mechanism was regarded as one of the most important ways of promoting teachers' human capital (H1; H3; H4; H5; H9). Not only did novice teachers' improve through the guidance of their leaders, the experienced teachers also

acquired new knowledge and methods from their apprentices. The daily TRG activities were also vital resources used by the teachers to improve their human capital. Teachers shared their teaching skills through these regular gatherings. At the same time, novice teachers' subject knowledge was also polished. In other words, this shared personal practice was critical for human capital building. At the organizational level, various meetings, training exercises, forums, and competitions pushed the teachers to hone their teaching skills. A novice teacher at H high school expressed the following:

I never feel that it is a burden to have such varied teaching research activities. On the contrary, I feel fortunate to be a member of H high school. I graduated from a very average university and I was not the best graduate in my class at university as well. But now, with one year of learning and teaching experience at H high school, I am confident in saying that I would be in the top three in my class [in university], no matter whether in teaching skills or subject knowledge. When I stood on the stage for the first time, you cannot imagine how nervous I was, but now, the grades of my students have improved a lot, and I believe I am on the way to becoming a fabulous teacher. I truly appreciate the learning atmosphere and the support from different levels at H high school. (HT12)

Moreover, the school vision of pursuing outstanding achievement pushed the teachers work hard to achieve better teaching quality and keep polishing their subject knowledge and teaching skills. One of the novice teachers commented,

In our school, an annual meeting is held to praise the excellent teachers. Most of the teachers... more than two-thirds (of teachers)... will be rewarded, and they will go on the stage to receive the certificate from the principal. The rest of the teachers who are not praised will definitely be embarrassed. Of course, they will try their best to improve their individual capacity and hope they will stand on the stage next year. (HT5)

According to the feedback from the teachers and teacher leaders, a well-accepted school vision, collective responsibilities, school supports, shared practice, continuous interactions, and individual reflection are all crucial for human capital building in the PLC context.

4.2.2 Social capital

There is no doubt that teachers' human capital was improved by taking part in the many kinds of professional learning activities offered in the PLCs in H high school. As Hargreaves & Fullan (2012) claim, human capital cannot be developed in isolation by individuals; in the field of education, teamwork is essential to the this type of capital. The development of social capital also relies on collaboration; it requires constructing a network with a culture of communication, learning, trust, and cooperation (Hargreaves & Fullan, 2012). The improvement of human capital in the context of PLC development in turn cultivates social capital (Walker, 2017).

In H high school, the various collective activities promoted the building of teachers' social capital. The daily lesson preparations, new lesson discussions, and class observations all required the teachers' participation. While observing a lesson preparation meeting of one TRG in H high school, we were surprised by the relaxed atmosphere. Even the subject

head teacher and other very experienced teachers did not have absolute authority; instead, they conducted discussions in a casual and collaborative way. A young teacher explained the reason for this:

In our [TRG] group, I do not have much difficulty talking with my leader or experienced teachers... I cannot say that I have no difficulty at all, but at least I am not too nervous when we have meetings...they [colleagues and leaders] are all nice and kind. My subject head always says that, in our school, we are allowed to make mistakes. I feel free to say my opinions, and the experienced teachers will help us if we have issues. Actually, young teachers also have their strengths, like searching for information and finding the newest and most interesting teaching material, which we like to share with other teachers as well. (HT1)

The subject head of a TRG plays an important role in coordinating the relationships among the teachers in the group and sets the tone for discussion. A trusting and respectful relationship among teachers is essential for the development of social capital. A subject head teacher remarked,

The eventual goal of the TRG is to improve the teachers' teaching quality and efficiency and then improve the students' academic performance. Due to the same vision and goal, even though there are some contradictions among the teachers, they are not difficult to resolve. Of course, the wisdom of group leaders is indispensable. (HT4)

At the same time, evaluation standards also played an important role in promoting teacher collaboration. As mentioned above, the teachers were evaluated within a TRG, and this strategy contributed to promoting teachers' desire to collaborate with others (HT7; HT8).

Another way of promoting social capital is the master-apprentice mechanism. When the mentors were asked why they devoted their personal time to helping others hone their teaching skills and address day-to-day issues, one of the commonly used words was "inheritance." One of the mentors mentioned the following:

I matured with the help of my mentor. He taught me all the things he knew, and he gave me the most solid support when I had difficulties in teaching and even in my life. So, when I have an apprentice, I also want to treat him/her like my mentors did me. I cannot explain the reason why I would like to spend time on them, I just know I have to. There is a culture of "inheritance" in H high school. (HT3)

Therefore, this study shows that a well-accepted school vision, a trusting and respectful culture, a clear evaluation standard, and mentorship are all essential to promoting social capital in schools.

4.2.3 Decisional capital

The teacher who has decisional capital has the capacity to make judgments without guidance or reference (Hargreaves & Fullan, 2012). Hargreaves & Fullan (2012) suggest that the best way for teachers to promote their decisional capital development is to work with others—with their principal, their peers, and their leaders, whether inside or outside of the school—and receive feedback. Among all of the above-mentioned methods, interaction with colleagues is the best

way to promote the improvement of decisional capital (Hargreaves & Fullan, 2012). Curriculum reform is taking place in China, with the College Entrance Examination under revision. Thus, teachers are facing uncertainty about the future path of education in China. Against this background, teachers' daily professional learning becomes a process of developing their decisional capital through continuous interactions. For example, collaboration between experienced and novice teachers results in a win-win situation—young teachers are skilled at searching out the newest information and teaching methods, while veteran teachers can identify the most efficient methods and teaching materials based on their rich teaching experience. In other words, experienced teachers pass their decisional capital to young teachers through collaboration and interaction. A similar situation also arises in TRGs. When teachers have issues, they can bring their problems to these groups and discuss them. Experienced teachers who have more decisional capital can provide valuable direction for newer teachers. One novice teacher commented,

I believe that experienced teachers in our group (TRG) are the most precious treasure. Although there are a lot of problems that they have never encountered before in the process of teaching, they can always find the best way to deal with these, according to their experience. Obviously, with the development of teaching technology, there are more and more problems they cannot deal with, but they usually have the right intuition from their experience and give us a direction to work towards. As a new teacher, I learned how they make these correct decisions, but there is still a long way to go ... [laughter]. (HT12)

The culture of trust and communication can help to build teachers' decisional capital through group learning.

During the COVID-19 pandemic, the teachers at H high school experienced a situation they had never encountered before; they faced great challenges in maintaining normal teaching and learning activities. In this period, the teachers' decisional capital improved rapidly. Online teaching was unfamiliar to them and multiple unexpected challenges arose every day; however, online connections between teachers through WeChat groups helped them to interact and collaborate in the absence of face-to-face meetings. In this unprecedented period, the teachers in H high school built an online teaching system, and schedules for online teaching research activities were also arranged. As one of the teachers relayed,

I don't really understand the decisional capital you mentioned; [however,] I am sure the unexpected experience [the COVID-19 outbreak] let me feel more confident about meeting the next similar challenge. I believe in the team energy... We can talk anytime... I am sure I will know what to do next time. (HT9)

It was found in this study that team support, mentorship, and challenging circumstances had significant influences on the building of decisional capital.

4.2.4 Psychological capital

In the process of PLC development in H high school, teachers' self-efficacy and motivation were of critical importance. The reasoning behind their devotion to teaching was

complex. The school culture, collective responsibilities, self-efficacy, and school support (including material rewards and human resource support) were all elements that motivated the teachers to work hard. In the process of promoting professional capital (including human capital, social capital, and decisional capital), the teachers' psychological capital, which refers to their positive mental psychological status (Luthans et al., 2007), was improved as well (Bissessar, 2014). The principal of H high school once claimed in an interview that "one of the secrets to the success of H high school is a positive spirit." The teachers also agreed with this point of view. One of the teachers expressed,

To be honest, I got a lot of energy from our [TRG] group, especially from the perspective of spiritual healing...When I was a new teacher, I usually didn't know how to perform well in class teaching...I felt much pressure. Luckily, the teachers around me would offer to help me, not only in terms of the pedagogy but also encouraging me with friendly words. Their words gave me the energy to take part in the group activity and not feel embarrassed. Our group is just like a big family, and I enjoyed the process of growing up in this warm family. (HT9)

The supportive conditions, including collaborative leadership and a collective culture, not only in the subject TRG but also in the whole school, provided the teachers with a positive psychological status. This kind of emotional value offered by the school PLC made it possible to build teachers' psychological capital gradually.

5. Discussion

Compared with teachers in China's largest cities, who are generally well trained, conduct regular subject research, and use this research in their daily teaching (Chen, 2020), the teachers at H high school do not spend much time on subject research, including conducting applied research projects. The teachers at H high school, which is located in an undeveloped area in China, maintain more traditional ways of conducting teaching research and aim to execute their tasks as flawlessly as possible. Against a background of a lack of education resources and fewer human resources than in larger cities, teachers' priority task in China's undeveloped areas is to give more students the opportunity to go to university. In order to do this, they strive to improve their teaching methods. The teachers in undeveloped areas often do not have advanced degrees or rich teaching resources; nevertheless, the students at H high school perform better than many students from large cities, who benefit from better educational resources. It is clear that teaching quality has a direct positive relationship with students' academic performance and that teachers' professional development plays a crucial role in the improvement of students' learning.

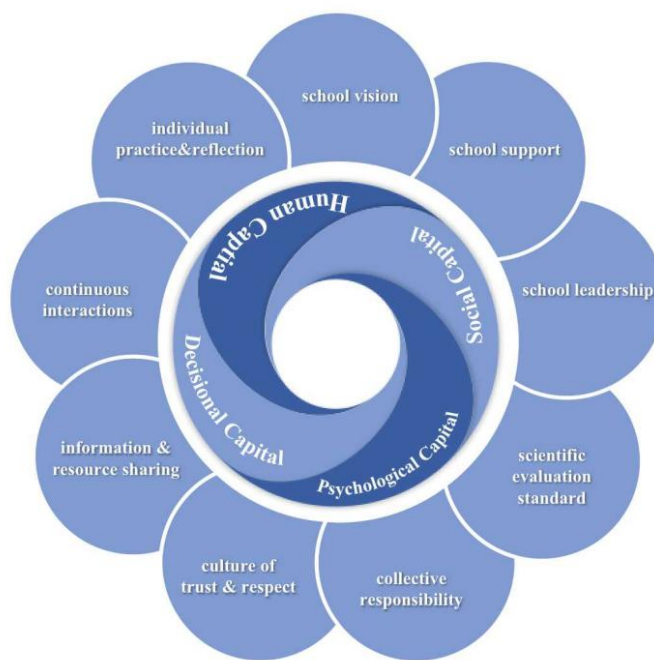


Fig. 4. Professional capital building in H high school.

Based on the results of interviews and observations, and combined with the characteristics of PLCs as described in the literature, we conclude that school vision (Lee & Lee, 2018), school support (Campbell et al., 2016), shared leadership (Nappi, 2014), scientific evaluation standards (Nolan & Molla, 2017), collective responsibility (DeMatthews, 2014), a culture of trust and respect (Gray et al., 2016), information and resource sharing (Fullan et al., 2015), continuous interactions, and individual practice and reflection (Kim & Martin, 2020) are the characteristics of the PLCs in H high school that result in their overall success.

The development of professional capital through PLCs in H high school can be deemed successful. Most of the teachers in this study felt satisfied with their professional learning, and the students' academic performance flourished under the development of their teachers' professional capital (Hargreaves & Fullan, 2012). Moreover, PLC activities not only improve the teacher professional capital but also raise the scope of impact of teachers' professional capital from the individual level to the organizational level, which overcome the shortage of too much individualistic for teacher professional capital building. Meanwhile, PLCs provide the opportunity that all of the teachers can work and learn together, the widely discussion, communication, and the mutual help and sharing among the teachers make the capital building happens on all of the teachers together. It decreases the risk of existing inequalities in PLCs through improving the capital for all of the members in the group. The professional capital building will also strengthen the development of PLCs through cultivating a collaborative environment and improving teachers' professional knowledge and abilities.

6. Conclusions

This study explored how the development of PLCs contributes to the building of teacher professional capital in a high school located in an undeveloped area of China. The findings show that the PLCs in H high school—characterized by school vision, school support, shared leadership, scientific evaluation standards, collective responsibility, a culture of trust and respect, information and resource sharing, continuous interactions, and individual practice and reflection—effectively promoted the building of teachers' human, social, and decisional capital. Positive psychological factors also made a great difference in this process.

However, we offer some suggestions for professional capital building in this context. First, the strong performance of the PLCs in H high school is due, in part, to the hard work of teachers. Compared with the norm of eight hours of teaching work each day, the teachers in H high school spend much more time at school, preparing lessons and participating in professional learning activities. Although the teachers in this study expressed that this workload did not make them feel uncomfortable and that they even enjoyed it, this is not sustainable in the long term. PLCs should create a more efficient way of promoting teacher professional capital building. In addition, teacher leaders should be authorized to do more to promote teachers' professional capital building. While this is not easy to realize in a hierarchical and distanced culture, evidence has shown that sharing leadership in teaching will promote teacher development. Teacher autonomy should be cultivated (Fullan et al., 2015; Osmond-Johnson, 2017). Additionally, when improving teachers' capacity, greater attention should be paid to their mental health. There is evidence in this article and elsewhere to support the idea that having a positive mental state can greatly aid in developing one's professional network and improving one's teaching abilities.

There were limitations to this study. The first is that H high school was treated as a typical case of the undeveloped areas in China. However, due to the strong performance of the students in H high school, it enjoys greater attention and resources than other schools in the same area. Other schools in undeveloped areas may need to address specific challenges that weren't mentioned in this article. Moreover, while this article aimed to describe how PLCs promote professional capital building, the path through which professional capital affects teachers' performance within a community is still in need of exploration.

Conflict of interest

The authors declare no conflict of interest.

Open Access This article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY-NC-ND) license, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

References

- Bai, B., Nie, R., Li, Y., & Wu, Q. (2026). Adult learning in the United Kingdom: Participation trends, changing learning practices and structural challenges. *Education and Lifelong Development Research*, 3(2), 60-70.
- Bissessar, C. S. (2014). An exploration of the relationship between teachers' psychological capital and their collective self-esteem. *Australian Journal of Teacher Education*, 39(9), 35-52.
- Bourdieu, P. (2018). The forms of capital. In M. Granovetter and R. Swedberg (Eds.), *The sociology of economic life* (3rd ed., pp. 78-92). Routledge.
- Boyd, V. (1992). *School context: Bridge or barrier for change?* Austin, TX: Southwest Educational Development Laboratory.
- Bray-Clark, N., & Bates, R. (2003). Self-efficacy beliefs and teacher effectiveness: Implications for professional development. *Professional Educator*, 26(1), 13-22.
- Brown, B. D., Horn, R. S., & King, G. (2018). The effective implementation of professional learning communities. *Alabama Journal of Educational Leadership*, 5, 53-59.
- Campbell, C., Lieberman, A., & Yashkina, A. (2016). Developing professional capital in policy and practice. *Journal of Professional Capital and Community*, 1(3), 219-236.
- Carpenter, D. (2018). Intellectual and physical shared workspace: Professional learning communities and the collaborative culture. *International Journal of Educational Management*, 32(1), 121-140.
- Chapman, C., Chestnutt, H., Friel, N., Hall, S., & Lowden, K. (2016). Professional capital and collaborative inquiry networks for educational equity and improvement?. *Journal of Professional Capital and Community*, 1(3), 178-197.
- Chen, L. (2020). A historical review of professional learning communities in China (1949-2019): Some implications for collaborative teacher professional development. *Asia Pacific Journal of Education*, 40(3), 373-385.
- Chen, W. L., Elchert, D., & Asikin-Garmager, A. (2018). Comparing the effects of teacher collaboration on student performance in Taiwan, Hong Kong and Singapore. *Compare: A Journal of Comparative and International Education*, 50(4), 515-532.
- Daly, A. J., Moolenaar, N. M., Der-Martirosian, C., & Liou, Y. H. (2014). Accessing capital resources: Investigating the effects of teacher human and social capital on student achievement. *Teachers College Record*, 116(7), 1-42.
- DeMatthews, D. E. (2014). Principal and teacher collaboration: An exploration of distributed leadership in professional learning communities. *International Journal of Educational Leadership and Management*, 2(2), 176-206.
- DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321.
- DuFour, D. R. (2008). *The art of shrinking heads: On the new servitude of the liberated in the age of total capitalism*. Polity.
- DuFour, R. (2003). Building a professional learning community. *School Administrator*, 60(5), 13-18.
- DuFour, R. (2004). What is a "professional learning community"? *Educational Leadership*, 61(8), 6-11.
- DuFour, R., & Reeves, D. (2016). The futility of PLC lite. *Phi Delta Kappan*, 97(6), 69-71.
- Fullan, M., Rincón-Gallardo, S., & Hargreaves, A. (2015). Professional capital as accountability. *Education Policy Analysis Archives*, 23(15).

- Gray, J., Kruse, S., & Tarter, C. J. (2016). Enabling school structures, collegial trust and academic emphasis: Antecedents of professional learning communities. *Educational Management Administration & Leadership*, 44(6), 875-891.
- Guo, L., Huang, J., & Zhang, Y. (2019). Education development in China: Education return, quality, and equity. *Sustainability*, 11(13), 37-50.
- Hairon, S., & Dimmock, C. (2012). Singapore schools and professional learning communities: Teacher professional development and school leadership in an Asian hierarchical system. *Educational Review*, 64(4), 405-424.
- Hairon, S., & Tan, C. (2017). Professional learning communities in Singapore and Shanghai: Implications for teacher collaboration. *Compare: A Journal of Comparative and International Education*, 47(1), 91-104.
- Hargreaves, A. (2019). Teacher collaboration: 30 years of research on its nature, forms, limitations and effects. *Teachers and Teaching*, 25(5), 603-621.
- Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching in every school*. Teachers College Press.
- Hargreaves, A., & Fullan, M. (2013). The power of professional capital. *Journal of Staff Development*, 34(3), 36-39.
- Hargreaves, A., & Fullan, M. (2015). *Professional capital: Transforming teaching in every school*. Teachers College Press.
- Harris, A., & Jones, M. (2010). Professional learning communities and system improvement. *Improving Schools*, 13(2), 172-181.
- Hoaglund, A., Birkenfeld, K., & Box, J. (2014). Professional learning communities: Creating a foundation for collaboration skills in pre-service teachers. *Education*, 134(4), 521-528.
- Hord, S. (2004). *Learning together, leading together: Changing schools through professional learning communities*. Teachers College Press.
- Hord, S. M. (1998). Creating a professional learning community: Cottonwood Creek School. *Issues About Change*, 6(2).
- Hord, S. M., Abrego, J., Moller, G., Olivier, D. F., Pankake, A. M., & Roundtree, L. (2010). *Demystifying professional learning communities: School leadership at its best*. R&L Education.
- Kim, M. J., & Martin, K. (2020). How rural educators improve professional capital in a blended professional learning network. In L. Schnellert (Ed.), *Professional learning networks: Facilitating transformation in diverse contexts with equity-seeking communities* (pp. 107-139). Emerald Publishing Limited.
- Leana, C. R. (2011). *The missing link in school reform*. Stanford Social Innovation Review.
- Lee, D. H. L., & Lee, W. O. (2018). Transformational change in instruction with professional learning communities? The influence of teacher cultural disposition in high power distance contexts. *Journal of Educational Change*, 19(4), 463-488.
- Lin, N. (1999). Social networks and status attainment. *Annual Review of Sociology*, 25(1), 467-487.
- Lin, N., & Erickson, B. (Eds.). (2008). *Social capital: An international research program*. OUP Oxford.
- Lindahl, R. A. (2010). Differences in principals' leadership behavior in high-and low-performing schools. *Journal of Leadership Studies*, 3(4), 34-45.
- Lomos, C., Hofman, R. H., & Bosker, R. J. (2011). Professional communities and student achievement—a meta-analysis. *School Effectiveness and School Improvement*, 22(2), 121-148.
- Louis, K. S., Kruse, S. D., & Bryk, A. S. (1995). Professionalism and community: What is it and why is it important in urban schools?
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, 60(3), 541-572.
- Murphy, J. (2015). Creating communities of professionalism: Addressing cultural and structural barriers. *Journal of Educational Administration*, 53(2), 154-176.
- Nappi, J. S. (2014). The teacher leader: Improving schools by building social capital through shared leadership. *Delta Kappa Gamma Bulletin*, 80(4), 29-34.
- Nolan, A., & Molla, T. (2017). Teacher confidence and professional capital. *Teaching and Teacher Education*, 62, 10-18.
- Olivier, D. F., & Huffman, J. B. (2016). Professional learning community process in the United States: Conceptualization of the process and district support for schools. *Asia Pacific Journal of Education*, 36(2), 301-317.
- Osmond-Johnson, P. (2017). Leading professional learning to develop professional capital: The Saskatchewan Professional Development Unit's facilitator community. *International Journal of Teacher Leadership*, 8(1), 26-42.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Sage.
- Pil, F. K., & Leana, C. (2009). Applying organizational research to public school reform: The effects of teacher human and social capital on student performance. *Academy of Management Journal*, 52(6), 1101-1124.
- Qian, H. Y., & Allan, W. (2020). Creating conditions for professional learning communities (PLCs) in schools in China: The role of school principals. *Professional Development in Education*, 47(4), 586-598.
- Qiao, X., Yu, S., & Zhang, L. (2018). A review of research on professional learning communities in mainland China (2006-2015) Key findings and emerging themes. *Educational Management Administration & Leadership*, 46(5), 713-728.
- Ratts, R. F., Pate, J. L., Archibald, J. G., Andrews, S. P., Ballard, C. C., & Lowney, K. S. (2015). The influence of professional learning communities on student achievement in elementary schools. *Journal of Education & Social Policy*, 2(4), 51-61.
- Salleh, H. (2016). Facilitation for professional learning community conversations in Singapore. *Asia Pacific Journal of Education*, 36(2), 285-300.

- Shirley, D. (2016). Three forms of professional capital: Systemic, social movement, and activist. *Journal of Professional Capital and Community*, 1(4), 302-320.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7(4), 221-258.
- Tan, X. X. (2018). Influencing the lives through lives: The development of teacher practice communities and professional capital [Doctoral dissertation, Taipei Normal University], 1-207. (in Chinese)
- Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2008). Teacher professional learning and development (Vol. 18). International Academy of Education.
- Tong, W., & Razniak, A. (2017). Building professional capital within a 21st century learning framework. *Journal of Professional Capital and Community*, 2(1), 36-49.
- Vanblaere, B., & Devos, G. (2016). Exploring the link between experienced teachers' learning outcomes and individual and professional learning community characteristics. *School Effectiveness and School Improvement*, 27(2), 205-227.
- Vangrieken, K., Meredith, C., Packer, T., & Kyndt, E. (2017). Teacher communities as a context for professional development: A systematic review. *Teaching and Teacher Education*, 61, 47-59.
- Walker, A. E. (2017). Elementary teachers' perception of professional capital within their community of practice [Doctoral dissertation, Mercer University]. URSA: Mercer University Research, Scholarship, and Archives.
- Wei, Y. (2021). The empirical research on the impact of teachers' participation in professional development activities on students' academic performance. *Education and Economics*, 37(01), 74-82+96. (in Chinese)
- Wilson, A. (2016). From professional practice to practical leader: Teacher leadership in professional learning communities. *International Journal of Teacher Leadership*, 7(2), 45-62.
- Wong, J. L. (2010). Searching for good practice in teaching: A comparison of two subject based professional learning communities in a secondary school in Shanghai. *Compare: A Journal of Comparative and International Education*, 40(5), 623-639.
- Yin, H., To, K. H., Keung, C. P. C., & Tam, W. W. Y. (2019). Professional learning communities count: Examining the relationship between faculty trust and teacher professional learning in Hong Kong kindergartens. *Teaching and Teacher Education*, 82, 153-163.
- Yin, R. (2006). Case study methods. In J. L. Green, G. Camilli, & P. B. Elmore (Eds.), *Handbook of complementary methods in education research* (pp. 111-122). American Educational Research Association.
- Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). Sage.
- Zhang, M., Jiang, Q. H., & Fang, T. T. (2025). Teacher allocation as a global concern: China's policy experience over nearly three decades. *Education and Lifelong Development Research*, 2(3), 114-124.
- Zhang, J., & Pang, N. S. K. (2016). Exploring the characteristics of professional learning communities in China: A mixed-method study. *The Asia-Pacific Education Researcher*, 25(1), 11-21.
- Zhang, J., Yuan, R., & Yu, S. (2017). What impedes the development of professional learning communities in China? Perceptions from leaders and frontline teachers in three schools in Shanghai. *Educational Management Administration & Leadership*, 45(2), 219-237.
- Zhang, X., & Wong, J. L. N. (2018). How do teachers learn together? A study of school-based teacher learning in China from the perspective of organizational learning. *Teachers and Teaching*, 24(2), 119-134.
- Zhao, J., Pei, X. N., Feng, R., Cheng, J. M., & Jin, Y. L. (2013). Teacher professional development practice and the effect on students' academic performance in China. *Global Education*, 42(2), 22-33+55. (in Chinese)