

A Systematic Review of Investigating Professional Learning Community from the Perspective of Cultural-historical Activity Theory: What Key Issues Have Been Raised in Two Decades of Research

Shaohui Zhang^{1,2}

¹PhD Candidate, School of English and International Studies, Beijing Foreign Studies University, Beijing, China

²Senior Teacher, New Century Senior High School, Qinhuangdao, Hebei, China

Abstract: This article systematically reviews 18 studies on PLC within the theoretical framework of CHAT and detects the categories of the key issues raised by the eligible documents pertinent to the subject matter and the specific research questions raised thereby from the ontological, epistemological and methodological perspective as well as the rationales for setting CHAT as the theoretical underpinning. The study of PLC from the perspective of CHAT is interdisciplinary research, involving educational psychology, organizational behaviorism and educational policy. CHAT is particularly concerned with social interaction and the use of tools at work, and how these elements form structure and drive change in practice. This review also provides implications for future research for conducting research on TPD based on PLC within the framework of CHAT. It is a trial to provide another perspective to investigate the extant studies in related fields and shed light on potential directions for future studies.

Keywords: Professional Learning Community; Cultural-historical Activity Theory; the Ontological, Epistemological and Methodological Perspective

1. Introduction

In the research into teacher professional development (TPD), in-depth research on teacher learning (TL) has been conducted. Under the guidance of Lev Vygotsky's *socio-cultural* theory, researchers have a new understanding of the nature of learning: learning is not only an individual act in nature, but also has social attributes. Therefore, in

order to promote the depth and effectiveness of TL, it is necessary to encourage teamwork and organizational learning. the acquisition of new information, new ideas and feedback not only comes from individual learning, but also, to a large extent, from the dialogue and interaction between teachers (Kitty, 2003). For this reason, PLC that embodies teachers' social cooperation is considered to be the key to improving the effectiveness of TL and realizing "in-depth learning" (Amy, 2005). In turn, it has become an effective strategy to promote learners' effective learning and promote the deep transformation and continuous improvement of schools.

Extant studies have demonstrated the significance of fostering teacher professional learning communities (PLC) to facilitate the growth and development of educators. Bianchini & Ca vazos (2007), through a case study of two new science teachers, found that teachers' participation in PLC is crucial to their professional growth. Vescio *et al.* (2008) reviewed 11 studies on the impact of PLC on teacher practice and students' performance, and found that all studies showed that PLC made teachers change in teaching practice, created a more authoritative learning milieu where participants have more volition to cooperate, focus on students' learning process, and persist in continuous learning, and also had a positive effect on student learning and improved students' achievement. Little's (2002b) case study on middle school English teachers explores the role of PLC in promoting TPD and its existing problems. Wu Han (2011) argues that one of the strategies to promote the independent professional development of novice foreign language teachers in universities is to build a teacher practice

community. Zhou Yan *et al.* (2008) and Gao Sixia (2011) through case studies proved that teacher practice community can effectively promote TPD. Wen Qiufang and Ren Qingmei (2011) tried to establish a new model for the interactive development of college foreign language teachers in the course of their research on “Teacher-Researcher Cooperative Development Community based on research on key classroom issues”. With the increasing application of information technology in the field of foreign language education, some researchers have investigated the professional growth of English teachers in the virtual practice community (Wang Qi, Fu Zheng 2011; Zhang Jie, Lin Li 2012; Wu Heping *et al.* 2013). From the extant research, it is a truism that empirical studies on second/foreign language teachers with specific identity characteristics and the mutual promoting function between constituting members and the PLC were rare.

Different theories have proposed different learning paths. *socio-cultural* Theory (Lantolf 2006) holds that in the process of problem solving, individuals acquire new knowledge through interaction with groups, and then internalize it to solve new problems. In the interaction between individuals and groups, in terms of teacher professional learning, many scholars (e. g. Bryk *et al.*, 1999; Silins *et al.*, 2002) believe that this is a complex activity, which requires the coordinated participation of individual and group cognitive, emotional and interpersonal activities. Therefore, the study on the learning effect of learning activities in the learning community of teacher professional development should include the above comprehensive factors.

It is a truism to say that PLC creates a social and cultural learning environment for participants. Admittedly, the framework of CHAT provides a useful theoretical analytical tool as CHAT draws on an appropriate theoretical perspective for observing and analyzing the interaction between individual teachers and the social and cultural environment. Thus, an increasing number of studies are switching to research into PLC within the framework of CHAT. In view of this point, a review is likely to be a trial to fill the void by systematically reviewing research insights from existing empirical papers pertaining to this subject matter. the following

research questions are raised in this review:

What key research issues have been identified in extant research into PLC within the framework of CHAT?

What specific research questions have been raised as such based on the key research issues?

What are the rationales underlying the adoption of the analytical framework to address the correlated research questions?

Abbreviations

(PLC) Professional learning community

(AT) Activity Theory

(CHAT) Cultural-Historical Activity Theory

(TL) teacher learning

(TPD) teacher professional development

(ETL) English as a foreign language

(WoS) Web of Science

2. Literature Review

2.1 Professional Learning Community (PLC)

Karen E. Johnson(2006) pointed out that the past 40 years have witnessed a shift in the field of second language teacher education from the positivist paradigm to the interpretative or situated paradigm. the latter emphasizes that teacher learning is a socialization process of continuous cooperation and dialogue with others in the context. Shulman & Shulman(2004) also proposed that teacher learning and transformation should not only consider teachers’ cognition and individual constructs, but also be interpreted in the concepts of context and community. In line with this paradigm shift, PLC as a model of teacher education has attracted attention. In this kind of community, teachers usually take promoting students’ learning as the ultimate goal, and regularly interact, cooperate and reflect on teaching and learning issues with an inquiring attitude, so as to improve existing teaching practices (Bullough, 2007). the teacher professional learning community can adopt various forms, such as action research, exploratory practice, lesson studies and teacher research groups (Yan Yi and Yang Luxin 2017). Researchers argue that when teachers collectively question the validity of teaching conventions, examine new teaching concepts, find generative ways to acknowledge and respond to differences and conflicts, and actively engage in professional growth, conditions for improved teaching and learning are strengthened (Achinstein, 2002; Grossman,

Wineburg, & Woolworth, 2001; Gutierrez, 1996; King & Newmann, 1999; Little, 1990, 1999; Louis & Kruse, 1995; McLaughlin & Talbert, 2001; Stokes, 2001; Talbert, 1995; Westheimer, 1998; Witziers, Slegers & Imants, 1999). However, relatively few studies have examined the specific interactions and dynamics of professional learning communities that constitute innovative resources for teacher learning and teaching practice (Wilson & Berne, 1999). In the teacher professional learning community, teacher learning should show explicit characteristics in the process of daily contact with teachers (Little, 2002). Therefore, the learning characteristics of individual teachers in the community in their daily teaching work (in contact with other teachers in the community and with students) should be paid enough attention.

2.2 Cultural-Historical Activity Theory (CHAT)

In order to overcome the narrow objectivism of behaviorist psychology and the subjectivism of introspective psychology, Vygotsky established a new psychological paradigm based on Marxist thought, Cultural Historical Theory. Keeping punching on Vygotsky's academic achievements, his student and colleague Leont'ev continued and developed this theory, forming another branch of the school, the Activity Theory (AT). Although Leont'ev himself has always identified his theory the Activity Theory, Kohl and Engeström, while refining the second and developing the third generation of AT, often refer to it as "Cultural Historical Activity Theory" (CHAT). Heretofore, four generations of CHAT have been developed. In terms of the four generations, each generation is distinctive due to its unit of analysis. For the first generation this unit of analysis is mediated action. the second generation has the activity system as unit of analysis. the third generation has as unit of analysis a cluster of two or three activity systems or a network of multiple activity systems with a partially shared object. the fourth generation has as its tentative unit of analysis multiple intersecting cycles of expansive learning related to societally critical or fateful objects. Leont'ev, starting from the perspective of activities, believes that human development should be a process of interaction

between individuals and collectives (communities), and puts the focus of research on "object", believing that activities are object-oriented. As is indicated in **Fig. 1.**, Engeström (2018) emphasized the necessity to distinguish between the generalized object of the historically evolving activity system and the specific object as it appears to a particular subject, at a given moment, in a given action, since the object is an invitation to interpretation, personal sense making and societal transformation. To some extent, the object of an activity is typically difficult to define for the participants. the definition of the object of an activity is closely correlated to the confirmation of research questions of a specific research.

Therefore, this review intends to explore the object of the activity system through the research questions raised by the extant studies using CHAT as the theoretical analysis framework. Then, according to the fact that activities are object-oriented, this study is to explore and perceive the process of how an activity system is established and presented from the reviewed studies.

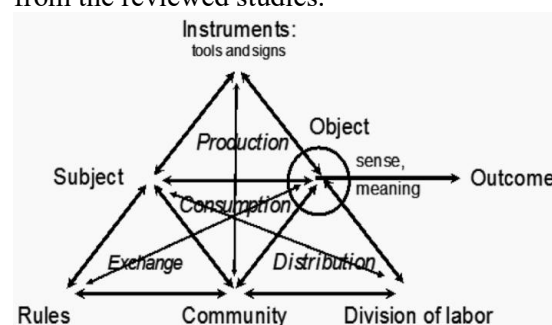


Figure 1. (Engeström, 1987:78; 2015:63)

2.3 Research into PLC within the Framework of CHAT

Most of the extant studies within the educational areas have applied CHAT to primary and secondary education, but the research on TPD based on PLC within the framework of CHAT needs to be strengthened. This fact also explains the reason why the sample size of the reviewed literature is small. *socio-cultural* theory places human learning and development in a complex system of society, culture, history, etc. Individuals develop cognition through interaction with the social and cultural environment (Vygotsky, 1978). PLC creates a social and cultural learning environment for participants.

Therefore, the framework of CHAT provides a useful theoretical analytical tool as CHAT draws on an appropriate theoretical perspective for observing and analyzing the interaction between individual teachers and the social and cultural environment wherein the participants are involved, conflict and resolution in the teacher professional learning community, and provides explanations for understanding the change and development of teachers' learning in the professional learning community (Swain, Kinnear & Steiman, 2015). Following this, this systematic review is to detect the categories of the key issues raised by the eligible documents pertinent to the subject matter, the specific research questions raised thereby as well as rationale for choosing CHAT as the theoretical underpinning.

3. Method

The following five steps are adopted to conduct this systematic review, including generating questions, identifying relevant works, evaluating the qualities of articles, summarizing the evidence, and reporting the findings (Khan, Kunz, Kleijnen & Antes, 2003). To select studies pertinent to the specific subject matter, it establishes a set of exclusion and inclusion criteria.

First, according to the research subject matter, it sets the Boolean expression as TS= ("Activity Theory" OR "CHAT") AND ("Teacher Professional Development" OR "Teacher Education") for an initial search. According to the procedure of Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) (Page *et al.*, 2021), this systematic review provides a flow diagram delineated in Fig. 2. Regarded as a collection of high quality, Web of Science (WoS) is set as the central database used for the initial search on research into TPD from the perspective of CHAT.

Gross documents based on the initial search added up to 398. In order to make the research target more precise, this review narrowed the research scope into PLC within general research into TPD. A further refinement displayed the left 38 documents. An initial-round screening was manipulated to exclude those beyond the scope of educational research. A total of 23 documents were selected. A second-round removed the documents with a topic word *chat* (to exchange messages with

other people rather than CHAT). In this way, only a total of 18 documents emerged from the pool for comprehensively reviewing.

Although the sample size is relatively small, the research subject matter of this review is refined into the specific scope of research into PLC from the perspective of CHAT based on the collection of documents from the high-grade database, WoS.

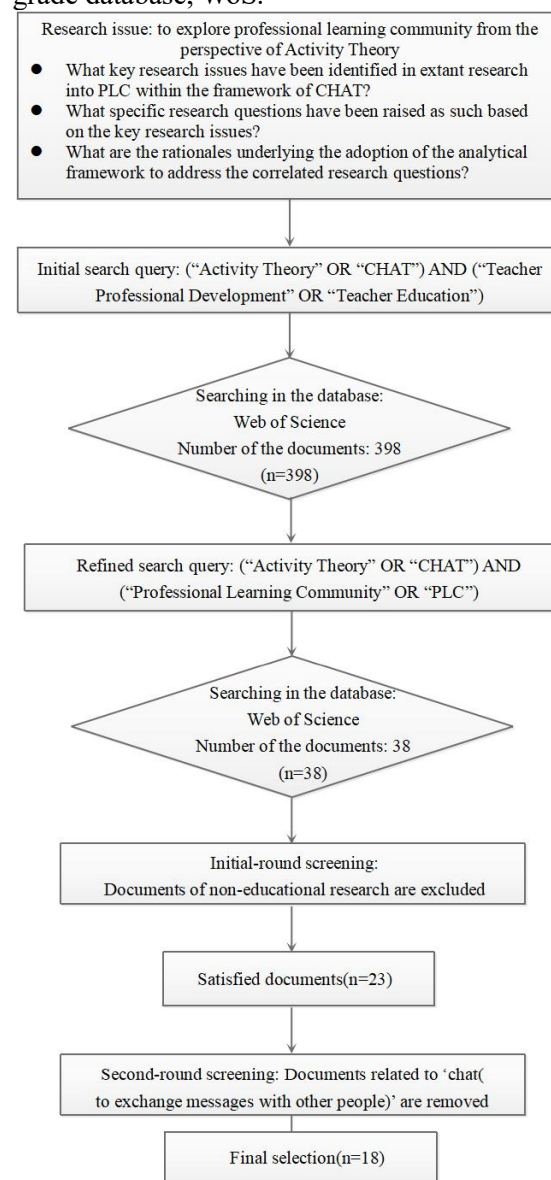


Figure 2. PRISMA flow diagram.

4. Results

In order to have a deeper understanding of the research trends of literature of the subject matter, this review study examines TPD from the perspective of CHAT in the following three aspects: research key issues, research questions raised as such, rationale underlying the adoption of the analytical framework to

address the correlated research questions.

4.1 Research Key Issues

The related research has gained momentum in the past decade. In view of the fact that human's knowledge and discovery in scientific research can be discussed from the philosophical perspective of ontology, epistemology and methodology, looking at the core issues of extant literature inquiry, this study finds that the extant studies were mainly conducted from three perspectives, namely, ontological perspective, epistemological perspective and methodological perspective. Respectively, **Table 1** shows that among the 18 documents, 10 were conducted from ontological perspective (accounting for 55.6%), 4 (accounting for 22.2%) from epistemological perspective and 4 (accounting for 22.2%) from methodological perspective.

Table 1. A review of the Research Perspective of the Key Issues of the Reviewed Studies.

Research perspective	Size of documents (N)	Percentage of correlational documents among the total size (Total size=18) (P)
Ontological perspective	N1=10	P1=55.6%
Epistemological perspective	N2=4	P2=22.2%
Methodological perspective	N3=4	P3=22.2%

4.1.1 Ontological perspective

Inspecting the essence or attributes of the subject matter, ontological issues originating from TPD in PLC with CHAT as a theoretical analytical framework are comprised of the major contradictions in EFL teacher PLC (Yan Yi & Yang Luxin, 2019), an equity-focused, faculty-led PLC cohort (Ho, 2023), tensions and contradictions emerging in a PLC and mediating learning (Tan & Thorius, 2019), key elements of collective learning in an A-college researcher PLC (Lee *et al.*, 2019), professional learning in a networked PLC (Ell & Major, 2019), the learning process and the contradictions of PLC among different activity systems (Zheng *et al.* 2021), factors (contradictions) that influence a beginning teacher's development in the context of multiple PLCs (Cheah *et al.*, 2019), professional learning practices in Lesson Study contexts (Lee *et al.*, 2020), distributed

leadership practice in a PLC (Chae & Hyung, 2021), contradictions and their manifestations in PLCs (Harvey & Nilsson, 2022).

4.1.2 Epistemological perspective

Key issues based on the epistemological perspective focus on the acquisition, evaluation and use of knowledge. Among the reviewed studies, key research issues based on this perspective comprise the role of PLC in developing EFL student-teachers' imagined identity (Meihami, 2019), the relationship between the strength of PLC dimensions and the level of Self-Direction in learning by teachers (Scholl, 2017), the ways in which participation in an online PLC supported/hindered participants' ability (Sessums, 2009), the Mediating Role of Coaches and PLCs (Marsh *et al.*, 2015).

4.1.3 Methodological perspective

Compared with ontological and epistemological perspectives, methodological perspective looks at the way things deal with problems. With regard to the reviewed studies, key issues in the basis of methodological perspective consist of the accountability and testing standards of a PLC were distributed and affected the daily practices of teachers wherein (King, 2006), the experimentation and inquiry process of a PLC of English teachers in a diverse middle school as they integrated civic learning and action into their English teaching practices (Lai, 2018), Within the PLC setting minimized and maximized teacher writing pedagogy practices (Mitchell, 2013), primary teachers' perceptions regarding how instructional components of a PLC challenged or strengthened instructional practices (McKinney, 2022).

4.2 Research Questions Raised as Such

These reviewed studies raised specific research questions based on the key research issues, and this systematic review aims to explore the nature or types of questions that the reviewed studies were designed to detect, which might provide possible implications that potential future studies can draw upon.

4.2.1 Research questions based on ontological issues

These raised research questions embraced the basic **element**, typical **feature** and application **practice** of PLC. As **Fig. 2**. Shows, among the 10 reviewed studies on ontological research issues, one study (Lee *et al.*, 2019) shows the

analyses of the basic elements of PLC are exemplified by primary components of an activity system, such as subject, object, tool, rules or regulations and so on. 6 studies (Yan & Yang, 2019; Ho, 2023; Tan & Thorius, 2019; Zheng *et al.*, 2021; Cheah *et al.*, 2019; Harvey & Nilsson, 2022) explored features aligned with the development of PLC, focusing on the contradictions or tensions emerging wherein. Specifically speaking, the research questions comprise the following aspects, that is, what are the contradictions or tensions of the PLC, how to tackle or solve these contradictions or tensions and how the contradictions or tensions are deployed to mediate or improve the learning process of PLC. 4 studies (Ell & Major, 2019; Zheng *et al.*, 2021; Lee & Tan2020; Chae & Hyung, 2021) investigated the application practice in PLC.

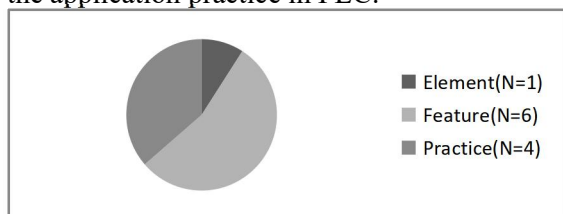


Figure 2. A Distribution Diagram of the Research Questions based on Ontological Issues

4.2.2 Research questions based on epistemological issues

Among the reviewed studies, this kind of research questions focus on the role or function of PLC, which are reflected in the following aspects, including ‘what the role of PLC in developing EFL student-teachers’ imagined identity is (Meihami, 2019), what interactions exist between the strength of PLC dimensions and the self-directed learning factor of Motivation, Self-efficacy, Initiative and Control reported by elementary? (Scholl, 2017), what the ways in which participation in an online PLC supported/hindered participants’ abilities are (Sessums, 2009) and how working with a coach or PLC shaped teachers’ teaching practice (Marsh *et al.*, 2015)’.

4.2.3 Research questions based on

methodological issues

Looking into the research questions based on methodological issues, this review discern the following aspects with respect to the reviewed studies, that is, how the daily practices of teachers within that community are affected (King, 2006), how civic learning and action in PLC are integrated into their English teaching practices (Lai, 2018), within the setting of PLC, what teacher writing pedagogy practices were minimized and maximized (Mitchell, 2013), how instructional components of a program conducted in PLC challenged or strengthened teachers’ instructional practices (McKinney, 2022).

4.3 Rationale Underlying the Adoption of CHAT in Research into Issues Concerning PLC

The reviewed studies were conducted with CHAT as a theoretical analytical framework that embodies spontaneous merits. As is shown in Table 2, this study aims to understand how these reviewed studies used the theoretical framework of CHAT to address the research questions which focus on different aspects of learning in PLC. Till now, the four generations of CHAT detect learning in different ways. the first generation regards learning as a process in which individuals and collectives act on specific objects. the second generation examines learning as an object-driven process in which mediated actions expand with three more factors, i. e. rules, community and division of labor. the third generation takes learning as process in which a network of two or multiple activity systems re-conceptualize their shared object and enact a shared pursuit of this object. the fourth generation recognizes learning as a process in which diverse unions of activities are formed by the intersection of their respective cycles of expansive learning. To address the research questions, the reviewed studies adopted the heterogeneous ways in which the subject matters of learning are examined.

Table 2. Reviewed Studies Conducted with CHAT as a Theoretical Analytical Framework

Studies	Key explored issues	Research questions raised as such	Rationale for choosing CHAT as the theoretical underpinning	Findings
1. Meihami, Hussein (2019)	the role of PLC in developing Iranian EFL student-teachers' imagined identity	What is the role of PLC in developing EFL student-teachers' imagined identity?	1) to detect how the subject-of-activity acts and engages with a specific system 2) to understand the teacher-as-learner through its activity and discourse in a specific system (Cross, 2020)	PLC could provide a venue for negotiating knowledge, develop a bottom-up collaborative culture, and create a trustful leadership context, which leads to student-teachers' imagined identity development.
2. Scholl, Steven Carl (2017)	the relationship between the strength of PLC dimensions and the level of Self-Direction in learning by teachers	What interactions exist between the strength of PLC dimensions and the self-directed learning factor of Motivation, Self-efficacy, Initiative and Control reported by elementary school teachers?	1) to examine the presence of learning of teachers within a school environment consisting of multiple activity systems 2) to explain and demonstrate how the tensions associated with interactivity of a school system can be a catalyst to promote or hamper the development of a	The PLC model had a statistically significant effect on teacher perceptions of composite scores for the four Self-Directed Learning factors.

			work group 3) to illustrate continuous interactions of the PLCs within the six factors of CHAT within public school systems	
3. Yan, Yi; Yang Luxin (2019)	the major contradictions in EFL teacher PLC established in China through a university-district-school partnership	Q1: Were there any contradictions in the development of an in-service EFL teacher PLC? Q2: If so, what were they and how were these contradictions tackled and resolved?	1) to understand dialogue, multiple perspectives and voices, and networks of interacting activity systems 2) to examine an evolving PLC for a group of school EFL teachers within the context of implementing the national English curriculum reform in China	Contradictions emerged between interrelated components within the new activity system and also between the new system and its neighbor activities. Four major contradictions were identified.
4. Ho, Tiffanie (2023)	an equity-focused, faculty-led PLC cohort that operated over one academic year in a community college	With the object of exploring equity in the PLC's activity system through engagement in an equity-focused project, what contradictions and associated learning actions emerged from the activity system?	To provide a sufficient lens and tool for better understanding what changes occur within PLCs that make them effective and worthy for sustained practice	It illuminates the understanding for how elements of PLCs, specifically dialogue and hands-on practices, function in order to inform the development and refinement of PLCs by applying a CHAT framework in examining the intersection of PLCs and equity in higher education.
5. Tan, Paul; Thorius, Kathleen King (2019)	tensions and contradictions that emerged during the PLC and mediated learning as evidenced by participants' expanded notions of equity	Q1: What tensions and contradictions are evoked and otherwise emerge during the professional learning activity system wherein we introduce tools and facilitate discussions with the object of advancing equity in mathematics education for students with dis/abilities? Q2: How any contradiction mediates learning as evidenced by participants' expanded notions of equity in mathematics education?	This study synthesized expansive learning with the equity concepts described in the previous section to formalize the concept of equity expansive learning and our rationale for its use including how it differs from more traditional approaches to examining PLC. To examine individual learning, it becomes necessary to examine the situation or context in which individuals interact. Such context constitutes an activity system (Engeström, 1987).	Participants recognized several tensions and proposed to address them as contradictions that mediated learning, thereby expanding notions of equitable education.
6. Lee, HyunMyoung; YoungTaek, Shim; NamGyun, Kim; Kim, MinJo (2019)	a case of a A-college researcher learning community based on activity theory which focuses on collective learning of human beings and to explore its effect and limitation.	What are the key elements (subject, object, tool, communities, rules and regulation) of the activity system focusing on collective learning of human beings with respect to the A-college researcher learning community?	It is based on activity theory which focuses on collective learning of human beings and to explore its effect and limitation.	An A-college researcher learning community could recognize its identity and orientation toward the characteristics of knowledge and identified its problems with respect to the establishment of educational institutions or developmental stages.
7. Ell, Fiona; Major, Karen (2019)	professional learning in a networked PLC	How can activity theory help to understand the professional learning that occurs, or does not occur, in a networked PLC?	1) The phenomenon of interest is the collective learning and actions of a group, which can be seen through their joint activity. 2) Engeström's (2001) framework is used to explain both the beginning of expansive learning for the cluster and how the expansive learning moment resulted in ending the group.	The concept of expansive learning is a useful tool for analyzing networked PLC functioning. In particular, drawing attention to the critical role of the object of activity provides PLC participants and researchers with a way to discuss and monitor learning in a PLC.
8. Zheng, Xin; Yin, Hongbiao; Wang, Xiaofang (2021)	the learning process of a group of teachers as they move across the school context and a research-oriented professional learning community (PLC) 2) the contradictions that teachers encounter among different activity systems and how these contradictions are resolved	Q1: Why did the teachers engage in the program? What activities did they engage in? Q2: What kinds of tools (conceptual or physical) were used to achieve the objects? Why were they created, and what were the teachers' perceptions of the tools? Q3: What were the results of engaging in the activity at different stages?	An activity system is always a community of multiple points of view, traditions and interests, which is a source of both trouble and innovation, demanding actions of both translation and negotiation.	Teachers are engaged in various research activities around "authentic" problems. Mediating tools are deliberately designed and used to address these problems, which facilitate teachers' learning process and the transformation of the community culture. The role of structural design and teacher leadership for teacher learning in PLCs is discussed.
9. Cheah, Yina; Ching Sing; Toh, Yancy (2019)	primary science teacher's technological pedagogical content knowledge (TPACK) development in the context of two interdependent learning spaces: a joint-school and a within-school professional learning community	What are the factors (contradictions) that influence a beginning teacher's TPACK development in the context of multiple PLCs?	CHAT as the analytical lens was employed 1) to unpack the complementary and contradictory interactions across different interrelated activity systems 2) to analyze teacher learning from both pedagogical and socio-cultural perspectives 3) To understand holistically the activities that promote or inhibit teacher TPACK development by examining the reciprocal relationships of the elements in an activity system and between activity systems (Engeström & Escalante 1996).	Interactions between the teacher's personal and contextual factors inhibited the designed TPACK from being implemented successfully. For ambitious pedagogical undertakings as illustrated in this case, more design thinking is needed to support beginning teachers' TPACK development
10. Lee, Lai Han; Judy; Tan, Seng Chee (2020)	Professional learning practices in Lesson Study contexts and discuss implications for enhancing teacher learning	Q1: What are the teacher learning practices that provided affordances to teacher learning? Q2: What are the teacher learning practices that produced disturbances to teacher learning? Q3: What are the underlying systemic contradictions revealed by the disturbances?	1) CHAT is a perspective that guides the study of human activity in a collective context. 2) CHAT views a work activity system as a whole, comprising individual workers and their co-workers, they a PLT during their weekly hour-long team meetings were examined to study learning work together, the conceptual models and instruments they use in their work, and the purpose to which the learning, learning practices that produced work community directs its activity (Engeström, 1987). 3) CHAT uses methods that take a systematic and systemic approach to analyze interactions in complex environments to help researchers understand "individual activity in relation to its context and how the individual, his/her activities, and the context affect one another" (Yamagata-Lynch, 2010, p. 1). 4) CHAT offers a way to explain the relationships between individual human activity and the broader cultural, institutional, and historical situations in which the activity occurs (Wertsch, Rio, & Alvarez, 1995)	Taking CHAT as the guiding methodological approach, the enactment of professional learning activities practices that provided affordances to teacher they use in their work, and the purpose to which the learning, learning practices that produced work community directs its activity (Engeström, 1987). disturbances to teacher learning, and what the about underlying systemic contradictions.
11. Chae, Yoonjung; Hyung Park Sun (2021)	Activity Theoretic Analysis on Distributed Leadership Practice in Free Year Program of Innovative School	Is there a qualitative path study on how leadership practice occurs within the unit school organization?	Engeström's activity theory comprehensively studies the dynamic interaction process of subject, object, and situation.	The distributed leadership of the principal is being implemented as the coordinator of the curriculum operation, and the distributed leadership of the teacher is being implemented as the subject of the curriculum operation.
12. Jennifer D. King (2006)	how the accountability and testing standards of No Child Left Behind (NCLB) were distributed within the socio-cultural context of a PLC and how they affected the daily practices of teachers within that community	1) How are the mandated accountability and testing standards of NCLB interpreted at the micro-level of a school community? 2) How are the objectives and tasks of implementing these standards distributed within the socio-cultural context of one school in an urban public school district? 3) Do these standards come to constitute the practice of teachers within this school?	AT is seen as an effective means for determining the objectives of accountability and testing at the micro-level. Activity theory is also effective in determining the distributed and constituted nature of accountability and testing, because it is grounded in the activity of particular community of practice.	Accountability and testing standards are distributed through the process of knowledge building and the use of conceptual tools as teachers work together to gain an understanding of the accountability and testing process and develop strategic plans regarding how to meet AYP requirements.
13. Lai, Paul F. (2018)	the experimentation and inquiry process of a PLC of English teachers in a diverse middle school as they integrated civic learning and action into their English teaching practices	Q1: In the PLC meetings, what tensions surfaced between typical English Language Arts (ELA) practices and youth civics practices, and how do the teachers conceptualize and respond to those tensions? Q2: What challenges and opportunities arise as the English teachers try to integrate civics with reading literature in their case study classrooms? Q3: What do ELA teachers discover about how their Civics English activity expands their ELA teaching and shifts their students' ELA learning experience?	to examine this teacher team's development and shifts through various tensions and challenges that arise, analyzing through the lenses of CHAT the ways their PLC operated as an English teaching activity system attempting to integrate the cultural activity of civic engagement, leading to the teachers' expansive and discursive models of professional learning (Engeström, 2001) about possibilities and challenges of Civics English.	Integrating civics causes shifts in the teachers' practices of literary study, writing, and classroom discussion, as they orient students' learning towards public audiences, collective action, and discursive models of political and professional discourse.

14. Mitchell, Joan F. (2013)	Re-visioning the writing classroom— an activity theory analysis of that teachers made about their writing pedagogy: the key settings in which these teachers operated. Q1: What primary motives drove their decisions within these settings, and what instructional tools they prioritized to achieve their objectives	Q1: What key settings influenced the decisions that teachers made about their writing pedagogy? Q2: What primary motives drove their decisions within these settings, and what instructional tools they prioritized to achieve their objectives? Q3: Within these settings, what teacher writing pedagogy practices were minimized and maximized?	The AT framework embraced the complexity of the act of writing instruction, provided a means of comparing individual and collective pedagogical decisions within a multilayered context, and positioned the inevitable tensions and contradictions within the system as opportunities for insight and transformation. AT was the perfect complement to this scenario because it allowed teachers to act like a photographer with a zoom lens who could zoom in on one teacher's decisions, analyze them, and then zoom back out to the larger system to see how those practices fit within the larger context.	No single factor (e. g., writing test, PLC team, class level, perception of students' abilities, teacher preparation, personal writing preferences) could be positioned as the reason that the tenth grade teachers chose to teach revision in the way that they did. Teachers are individuals who bring their own set of beliefs and experiences to the act of teaching, and they are entrenched in a complex network of settings and idiosyncratic preferences.
15. McKinney, Kiana Tene (2022)	To obtain primary teachers' perceptions regarding how instructional components of the Wilson Reading Fundations Program (WRFP) challenged or strengthened their instructional practices with assisting struggling readers gaining proficiency	What are K through third grade teachers' perceptions of the degree to which the WRFP is helping them assist struggling readers become proficient in reading in elementary grades, regarding strengths and challenges of the direct instruction component of the WRFP as it has been implemented in schools and regarding how WRFP implementation contributes to changes in instructional practices to better help struggling readers?	The principal focal point of AT is based on people constructing connotation and comprehension through an assigned activity. The activity theory involves the component of the investigation, where the activity is divided into subject, artifacts/tools, and object.	There is a direct correlation between teacher perceptions and providing quality professional development to increase student reading achievement.
16. Sessums, Christopher Davis (2009)	the case of a practice-based, task-oriented, online teacher PLC designed to further develop participants' knowledge and understanding of coaching teacher inquiry/action research	What are the ways in which participation in an online learning community (as a teacher professional development organizational structure) supported/hindered participants' abilities to (1) deepen their understanding of teacher inquiry/action research; (2) deepen their understanding of coaching other educators in the process of teacher inquiry/action research; and (3) deepen their understanding of their own evolving stance toward their coaching practice?	Methodologically, activity theory provides a means to (1) define participants' activities as a unit of study in the online learning community, (2) identify multiple data sources that draw attention to the broad patterns of activity associated with participation, and (3) analyze participants' inactions from their particular points of view (Nardi, 1996).	This study identified specific actions and roles within which teachers' learning can be meaningfully situated online, offering insight into the application of online learning communities for professional development purposes. It is hoped that this study will be helpful to those who facilitate online communities as well as those who seek such communities for growth and inspiration.
17. Harvey, Frida; Nilsson, Per (2022)	Contradictions and their manifestations in PLCs in mathematics	What contradictions can be manifested in PLCs in mathematics?	Identifying contradictions in PLCs are important, as the identification and resolution of contradictions are crucial to developing PLCs. This study conceptualized PLCs and contradictions within CHAT.	Our results can be used in designing PLCs in mathematics: they can be used to make visible and increase participants' awareness of contradictions involved in PLCs and thereby increase the possibility that the contradictions serve as sources of support rather than obstacles in the development of PLCs in mathematics.
18. Marsh, Julie A.; Bertrand, Melanie; Huguet, Alice (2015)	The Mediating Role of Coaches and PLCs	Q1: How working with a coach or PLC shaped teachers' responses to data in six middle schools and the factors that influenced the activities and effects of coaches and PLCs? Q2: How to deeply examine processes and identify key constructs and relationships to guide future research and practice.	Based on the analytical framework of CHAT, the dynamic relationship between vertical expertise (individual's knowledge and skills) and horizontal expertise (knowledge that is co-created through interactions and movement across contexts) may help explain the ways in which PLCs and coaches facilitated deeper level changes in pedagogy. Dialogue was a central mediating practice, and school leadership and the district-level context shaped the possibility for change.	Coaches and PLCs played important roles in mediating teachers' responses to data and were often associated with instances in which teachers used data to alter their instructional delivery (as opposed to surface-level changes in materials and topics).

Note: The order of the literature list is in accordance with the order after the final screening.

4.3.1 Learning as a process with individuals and collectives acting on specific objects

As for a large quantity of the reviewed studies, learning is examined as a process with individuals and collectives acting on specific objects. How the subject-of-activity acts and engages with a specific system and the teacher-as-learner through its activity and discourse in a specific system are detected (Meihami, 2019). CHAT is drawn on to provide a sufficient lens and tool for better understanding what changes occur within PLCs (Ho, 2023). the situation or context in an activity system in which individuals interact is examined (Tan & Thorius, 2019). CHAT viewing a work activity system as a whole, comprising both individual and collective work is employed (Lee & Tan 2020). AT is employed to focus on collective learning of human beings and to explore its effect and limitation (Lee *et al.*, 2019). A community of multiple points of view, traditions and interests and a source of both trouble and innovation is investigated (Zheng *et al.*, 2021). the principal focal point of AT which is based on people constructing connotation and comprehension through an assigned activity is employed (McKinney, 2022). CHAT provides a means to define

participants' activities as a unit of study in the online learning community (McKinney, 2022).

4.3.2 Learning as an object-driven process with mediated actions expanding in relation to rules, community and division of labor

CHAT is used to explain both the beginning of expansive learning for the cluster and how the expansive learning moment resulted in ending the group (Ell & Major, 2019). CHAT that comprehensively studies the dynamic interaction process of subject, object, and situation is employed (Chae & Hyung, 2021). the distributed and constituted nature that is grounded in the activity of a particular community of practice is detected (King, 2006). CHAT to explore the ways their PLC operated as an English teaching activity system attempting to integrate the cultural activity leading to the teachers' expansive professional learning employed (Lai, 2018). the complexity of the act of writing instruction, providing a means of comparing individual and collective pedagogical decisions within a multilayered context (Mitchell, 2013). PLCs and contradictions within CHAT are conceptualized (Harvey & Nilsson, 2022).

4.3.3 Learning is process with a network multiple activity systems re-conceptualizing

their shared object and enacting a shared pursuit of this object

The presence of learning of teachers within a school environment consisting of multiple activity systems is examined (Scholl, 2017). CHAT is employed to understand dialogue, multiple perspectives and voices, and networks of interacting activity systems (Yan & Yang, 2019). CHAT as the analytical lens was employed to unpack the complementary and contradictory interactions across different interrelated activity systems (Cheah *et al.*, 2019).

5. Discussions and Future Directions

By detecting the reviewed studies, this review finds that the extant studies were mainly conducted from three perspectives, namely, ontological perspective, epistemological perspective and methodological perspective. the research issues originating from TPD in PLC with CHAT as a theoretical analytical framework from the ontological perspective are mainly comprised of those concerning the essence or attributes of PLC, such as, the major contradictions in PLC, tensions emerging in a PLC and mediating learning, the learning cohort, key elements of collective learning in PLC, the learning process and the contradictions of PLC among different activity systems, professional learning practices in Lesson Study contexts, factors that influence a beginning teacher's development in the context of multiple PLCs and so on. Based on the epistemological perspective, the reviewed studies investigated those key research issues which comprise the role of PLC in developing EFL student-teachers' imagined identity, the influence of the strength of PLC dimensions on learning by teachers, the ways in which participation in an online PLC supported/hindered participants' ability, and so on. Key issues from the methodological perspective consist of how the influence of PLC is distributed and affects the daily practices of teachers wherein, the experimentation and inquiry process of a PLC in integrating learning and action into teaching practices, within the PLC setting minimized and maximized teacher writing pedagogy practices, primary teachers' perceptions regarding how instructional components of a PLC challenged or strengthened instructional practices and so on.

Therefore, in future studies from the ontological and epistemological perspectives, the learning characteristics of individual teachers in PLC in their daily teaching work (in contact with other teachers in the community and with students) should be paid enough attention to. In the studies from the epistemological perspectives, the role of individual teachers of PLC in improving or hampering the development of the cohort is expected to be strengthened. Furthermore, the trajectory of development and change of teachers in PLC, which is stimulated by the interaction between teachers and other members of the community, is worthy of attention, tracking and research. As for the methodological perspectives, more investigation is needed in detecting the implementation of learning in PLCA into teaching practices, such as specific interactions and dynamics of innovative resources for teacher learning and teaching practices.

To conclude, one limitation of this study is the small number of sample studies selected since some other appropriate articles may have existed in other databases. Even though this review narrows the scope of the studies of PLC into that within the theoretical framework of CHAT, it provides another perspective to investigate the extant studies in related fields and lists potential directions for future studies.

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