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以生態研究模型觀察EFL教師學習社群的專業發展：概念分析

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摘要

先前的專業學習社群研究都聚焦於數學、科學或混合於不同科目之中，忽略了專業學習社群在不同學科中可能會產生不同的影響。有鑒於在專業學習社群的研究之中，EFL教師的專業發展研究相對應的匱乏。因此，有必要深入了解專業學習社群中對EFL教師的專業發展。此外，傳統的教師專業發展研究中，所採用的線性路徑模型過於傾向簡化教師專業發展的複雜性，並且忽略了不同生態環境的相互影響。有鑒於以上的問題，本概念論文經由回顧近代教師專業發展文獻，並批判現有教師專業發展的模型，提出一個融合Bronfenbrenner（1979, 2005） Ehrenfeld (2022) 和Carpenter et al. (2022) 的生態模型，進而探討EFL教師在專業學習社群中的專業發展情況。此模型豐富了現有的框架, 超越線性專業發展路徑的模型，探究專業學習社群中的專業發展如何受到微觀、中觀、外觀、宏觀和時間因素的交互影響。透過深入研究多層次互動，此模型在專業學習社群中，對EFL教師複雜變化過程提供了更全面的闡釋。它不僅有助於實證研究各層次因素對EFL教師在專業學習社群中專業發展的影響，同時也提供了如何透過專業學習社群優化教師專業發展的實用見解。

關鍵字: 專業學習社群，EFL教師，教師專業發展

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Understanding EFL Teacher Professional Development in Professional Learning Communities from an Ecological Perspective: A Conceptual Analysis

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Abstract

Previous professional learning community (PLC) research often focuses on the effects of math, science, or mixed-subject PLCs, overlooking the potentially differing impacts of PLC development across subject-related communities. Given the paucity of research on EFL teachers' PD in PLCs, there is a need to gain a better understanding of how the subject-specific nature of PLCs affect EFL teachers' professional growth. In addition, traditional linear models of teacher professional development (TPD) tend to oversimplify the complexity and the interconnected influences of various ecological contexts in TPD. In light of these issues, this conceptual paper proposes an ecological model, drawing from Bronfenbrenner (1979, 2005), Ehrenfeld (2022), and Carpenter et al. (2022), to explore EFL teachers' PD in PLCs by scrutinizing recent TPD literature and critiquing existing models. This proposed model has enriched the existing frameworks by transcending linear approaches, examining how TPD within PLCs is shaped by the interplay of factors and interconnected influences at the micro-, meso-, exo-, macro-, and chrono-levels. This model contributes to a more comprehensive perspective on TPD within PLCs by delving into multilevel interactions for a nuanced understanding of the complex change process of EFL teachers within PLCs. This study not only facilitates empirical research on how factors at various levels influence EFL teachers' PD in PLCs, but also provides practical insights for optimizing TPD through PLCs.

Keywords: Professional learning communities, EFL teachers, teacher professional development

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1. Introduction

Due to the rapidly changing nature of society and the increasing demands emerging in the 21st century, teachers are encouraged to play the role of "high-level knowledge workers" with the goal of continually enhancing their professionalism (Schleicher 2012 11), thus enabling them to meet the diverse learning needs of their students (Desimone 2009; Kools & Stoll 2016). This demand is particularly important amidst the ever-evolving challenges that teachers face in education in the present world. Professional learning communities (PLCs) have thus received increasing attention from researchers, education practitioners and policymakers in recent decades because these communities have been linked to school improvement, teacher professional development (TPD), and student learning (Chiang et al. 2024; Bolam et al. 2005; Vescio et al. 2008).

Despite the increasing number of studies on the effects of PLCs on teacher learning, most studies on this topic have focused on the effects of mathematics PLCs, science PLCs or mixed-subjects PLCs (e.g., Akiba & Liang 2016; Jones et al. 2013), whereas the attention given to the effects of PLCs on teachers of English as a foreign language (EFL) or English as a second language (ESL) has been insufficient. Notably, the different extents of PLC development in various subject-related communities at different school levels may have differential impacts on teachers' learning outcomes (Stoll et al. 2006), leading to somewhat different processes. Additionally, many previous studies (e.g., Desimone et al. 2013) on teacher professional development (TPD) have used a linear pathway model to understand TPD processes (Boylan et al. 2018). According to this model, teachers first develop knowledge and beliefs by participating in TPD activities, thus leading to changes in teaching practices and eventually enhancing student learning (Ehrenfeld 2022). Similarly, many studies on the effects of PLCs on TPD have been correlational in nature, especially with respect to teacher efficacy and student learning, which also suggests a linear pathway perspective on TPD (Ehrenfeld 2022).

Although such a linear pathway model has typically been used to understand TPD processes in previous studies, it tends to overlook the complexity of TPD and the interconnected influences of different ecological contexts (Ehrenfeld 2022). Other recent models (e.g., Sancar et al. 2021) suggest the existence of multiple pathways for TPD, positing the interrelatedness of various components of TPD and different contextual

factors; however, Ehrenfeld (2022) argued that "it is not always clear which contexts warrant careful attention and which are overlooked" (490).

Therefore, a more comprehensive lens is needed to understand the process of TPD. This lens is particularly pertinent to the study of TPD in the context of PLCs because such communities are multifaceted and complicated (Doğan & Adams 2018). In their critique of previous PLC research, Hairon et al. (2017) suggested moving beyond the linear process of TPD to explore the effects of PLCs and highlighted the need to devote more effort to examining the various political, economic, social, and cultural factors that may moderate the relationship between teacher learning and PLCs in a broader context. Since an ecological perspective can provide a comprehensive understanding of human development by considering the entire ecosystem (Bronfenbrenner 1979), all the points discussed above reinforce the necessity of employing an ecological approach to study TPD in PLCs. This paper thus proposes a new lens, adapted from Bronfenbrenner (1979, 2005), Ehrenfeld (2022) and Carpenter et al. (2022), to offer a better understanding of the complex process underlying TPD in PLCs. This perspective, which is framed as a conceptual framework for this study, advances beyond linear, interconnected and complex models of TPD and facilitates in-depth exploration of how TPD in PLCs is influenced by interactions among various factors at the micro-, meso-, exo-, macro- and chrono-levels within a broader ecological context. In addition to offering theoretical insights into how TPD in PLCs is influenced by evolving environments, the proposed framework contributes to the knowledge base of PLC research by advancing Chiang et al.'s (2024) research agenda of hermeneutic inquiry to encompass in-depth explorations of teachers' lived experiences and PLC processes across various personal and societal dimensions.

This conceptual paper first briefly introduces two related topics: the development of PLCs and the development of TPD. It then reviews previous PLC research on EFL teachers' PD and critiques the theoretical models employed in previous studies to investigate TPD, highlighting the need for a novel lens for investigating English teachers' PD in PLCs. Following that, this paper presents a proposed ecological model that facilitates a comprehensive understanding of the complex process of TPD in PLCs. This paper concludes by discussing the potential contributions this proposed model can make to this area of research.

2. Literature Review

2.1. Professional Learning Communities

The term PLCs was first coined by Hord (1997), whose conceptual framework for the operationalization of PLCs has been widely acknowledged and applied (Zhang & Yuan 2020). The increasing popularity of PLCs in the past two decades can be attributed to a paradigm shift in people's approach to TPD, which has been "fueled by the complexities of teaching and learning within a climate of increasing accountability" (Vescio et al. 2008 80). As this reform has promoted new approaches to TPD with the goal of supporting school improvement, PLCs have been advocated as a way of advancing beyond traditional TPD, such as one-off workshops, by supporting teachers' attempts to rethink their practices, improve their teaching through collaboration and learning, and enhance student learning (Vescio et al. 2008).

Despite the absence of consensus regarding a universal definition of PLCs (Bolam et al. 2005), five common interconnected characteristics that PLCs share have been identified in previous PLC studies (Stoll et al. 2006). The first characteristic pertains to shared values and goals, which entail community members agree with and share the mission, vision, or operational principles of a school or PLC (Lomos et al. 2011). The second characteristic is the deprivatization of practice, which refers to the activities (e.g., mutual observations) through which teachers examine their own practices and both provide and receive meaningful feedback (Stoll et al. 2006). The third characteristic is reflective dialogue, which refers to interactions and conversations among teachers concerning teaching practices, educational issues, and student learning; through these interactions, teachers share and generate knowledge (Louis & Marks 1998). The fourth characteristic is a collective focus on student learning, which represents teachers' commitment and collective responsibility for improving student learning (Lomos et al. 2011). The fifth characteristic is collaborative activity, which emphasizes teachers' professional engagement in the task of discussing their teaching knowledge and skills with their colleagues (Stoll et al. 2006). These characteristics are assumed to be closely related to one another rather than operating individually. A change in one characteristic either within or outside the school may facilitate or disrupt the process of building PLCs (Bolam et al. 2005).

A PLC is involved in interactions among a group of community members who work collaboratively and collegially to enhance their effectiveness as professionals with the goal of enhancing student learning (Stoll et al. 2006). Thus, in this paper, a PLC is defined as a group of teaching practitioners who focus on "sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way" (Stoll et al. 2006 223).

2.2. Teacher Professional Development

The development of PLCs is closely intertwined with the progression of TPD. The development of TPD is influenced by numerous contextual factors, including social and economic conditions, policy changes (Bautista & Ortega-Ruiz 2015) and shifts in educational paradigms (Russ et al. 2016). Alzayed and Alabdulkareem (2020) summarized this situation as follows: "(t)he orientation of teacher professional development in the 21st century has shifted from training programs in fragmented skills to constructivism models" (18).

TPD in many countries is traditionally a top-down endeavor that is determined and structured by school administrators and external consultants rather than teachers (Diaz-Maggioli 2004); in particular, these figures accomplish this task without considering teachers' personal interests and needs (Flint et al. 2011). TPD is traditionally based on a model of the transmission of predefined knowledge (Flint et al. 2011), according to which experts present teaching strategies, while interactions among teachers are deemphasized (Afshar & Doosti 2022). In such an approach, teachers receive knowledge in individual workshops, which assume that they, in turn, will implement this knowledge in their classrooms, an approach "which places teachers in the role of knowledge consumer" (Borg 2015 5). This approach is generally believed to be ineffective because it does not consider the contextual factors and needs that affect teaching practices (Kırkgöz 2013) and thus "fails to produce sustained positive changes in teaching and learning" (Borg 2015 6).

In addition to the deficiency of the traditional model of TPD, owing to the movement toward school reform and accountability initiatives in the 1990s, a redefined role for TPD in the paths of teachers was highlighted (Diaz-Maggioli 2003). Teacher development thus shifted in a new direction. Teachers became expected to participate more actively in the leadership and development of education enterprises (York-Barr & Buke

2004),

including through site-based decision-making (David 1989) and PD schools (Darling-Hammond 1989). Teacher expertise came to be viewed as an indispensable component of a school's collaborative ability to foster educational advancement (Lai & Cheung 2015). Alongside these changes, situational and sociocultural perspectives on learning, which are rooted in constructivism, began to gain prominence in the 1990s and became more widespread in the 2000s (Russ et al. 2016). In addition to the increasingly diverse needs of teachers resulting from these accountability initiatives, teachers started to employ a wider range of PD strategies to accommodate their diverse needs, skills and knowledge, including peer coaching, study groups, mentoring, participatory practitioner research and communities of practice (Diaz-Maggioli 2003; Diaz-Maggioli 2004). At present, TPD ranges from individual workshops to action research, lesson studies and teacher study groups (Hung & Yeh 2013). Teachers' participation in PLCs is considered not only an important strategy for facilitating TPD but also for enhancing school effectiveness and implementing school reforms globally (Yin & Qin 2024).

2.3. Previous PLC Research on EFL Teachers ' Professional Development

Owing to this increasing interest in PLCs, a growing body of research with different assumptions, interests and foci has explored PLCs in various sociocultural and institutional contexts (Chiang et al. 2024). With the growing importance of the impacts of PLCs on TPD, more research has focused on whether and how PLCs impact teachers' PD in terms of teacher knowledge and teaching practices. For example, Jones et al. (2013) reported that by participating in a series of PLC meetings, science teachers developed PCK pertaining to planning science lessons and science curricula while using different assessment strategies and developing students' thinking in the context of science. Similarly, the science teachers who participated in Rahman's (2011) study presented an increase in PCK as they learned how to refine the use of inquiry-based teaching strategies and how to implement those strategies more effectively. However, studies on knowledge development and teaching practices among EFL teachers have received less attention and have reported mixed results. For example, in Wong's (2010) qualitative study, the characteristics of a weak PLC were observed in the context of a PLC targeting EFL teachers; this situation was due to weak bonds between the members and external experts and lower expectations of their work and endeavors, which resulted in an individualist approach to the task of developing pedagogical knowledge

and a lack of both "knowledge for practice" and "knowledge in practice" (634). In a rare attempt to explore EFL teachers' learning within a PLC in terms of teachers' knowledge, beliefs, teaching commitment and teaching practices, Cheng & Pan's (2019) discourse analysis study, despite its failure to specify teacher knowledge, revealed that "knowledge was claimed, recognized, contested and negotiated among the participants, which contributed to the collective knowledge construction in the PLC" (709).

Some studies have focused on the impact of PLCs on EFL teachers' PD in terms of beliefs and attitudes such as their development of efficacy. Although several studies have reported a positive relationship between collective learning in PLCs and teacher efficacy among EFL teachers (e.g., Porter 2014; Stegall 2011), these studies have been mostly correlational in nature. Only a handful of non-correlational PLC studies have specifically investigated EFL teachers' efficacy development (Pella 2012; Zonoubi et al. 2017) and identity development (Nishino 2012).

The reviewed PLC research has revealed two research gaps. The first and most important gap lies in the predominant focus of previous studies on the impacts of PLCs on teacher knowledge, teaching practices, and student learning, often in the contexts of mathematics PLCs, science PLCs, or mixed-subject PLCs (e.g., Akiba & Liang 2016; Jones et al. 2013), whereas the unique dynamics of English PLCs for EFL teachers and the effects of this approach on EFL teachers have received insufficient attention. Although certain characteristics, such as knowledge of the subject, are believed to be stable across different disciplines (Bell 2005), teachers are characterized by the specific subjects that they teach and the shared methodologies that they use to teach those subjects (Borg 2006). Previous research has demonstrated that teachers of different disciplines are associated with unique subcultures that are specific to their particular subject areas; these subcultures are shaped by shared beliefs regarding the limitations and opportunities available within the corresponding disciplines (Grossman & Stodolsky 1995). Moreover, according to Grossman and Stodolsky (1995), in contrast to science or mathematics, where subject content is often concrete and sequential, EFL teaching, which is shaped by broader communicative goals (Littlewood 2004), is a more abstract subject, thus offering higher levels of curricular flexibility and autonomy. Such subject-specific differences may elicit different reactions to curriculum innovations and new teaching practices, which are topics that frequently arise in the context of PLCs. These variations can

influence both teacher participation and the dynamics that are operative within PLCs, in line with prior research that has reported that variations in teacher collaboration and departmental interactions are associated with differences in subject matter (Van Veen et al. 2001). This complexity is further compounded by the evolving nature of language teaching and learning, which is shaped by various social, cultural, and linguistic factors (Larsen-Freeman 2015). According to Wenger (2011), each teacher community features its own approach to teaching challenges and develops what Shulman (1987) referred to as pedagogical content knowledge (Gleeson 2015). Therefore, the collaborative processes and impacts of PLCs among EFL teachers are likely to differ from the corresponding processes and impacts among teachers in other disciplines due to the influence of subject specificity on the ways in which teachers engage with and collaborate within departmental PLCs (Valckx 2021). This situation underscores the need for a more in-depth exploration of PLCs among EFL teachers, as previous PLC studies that have focused on science or mathematics teachers or general education teachers might not have fully captured the intricacies of the different PD processes associated with EFL teachers, whose work is uniquely dynamic and context-dependent (Lee 2010).

Another research gap pertains to the correlational nature of previous studies that have investigated the effects of PLCs on TPD, especially with respect to teacher efficacy, thereby suggesting a linear pathway perspective on TPD (Ehrenfeld 2022). Consequently, further research is warranted to obtain a more complete overview of the influence of PLCs on EFL teachers' PD.

3. Reconsidering Theoretical Models in Examining Teacher Professional Development

Although the research gaps discussed above prompt a demand for further research on EFL teachers' PD in PLCs, the widely adopted models that aim to investigate TPD may not facilitate a comprehensive analysis and examination of TPD in PLCs. In accordance with the literature on TPD, many previous studies on teachers' PD have been guided by two influential models in which a linear pathway (Desimone 2009; Guskey 2002), a multiple pathway model (Clarke & Hollingsworth 2002) and a system model (Opfer & Pedder 2011) are used to examine TPD (Boylan et al.

2018). These models advocate different conceptualizations of TPD on the basis of

different philosophical underpinnings (Boylan et al. 2018). For instance, Guskey (2002) identified PD as a complex process in which a TPD activity can result in changes in teachers' instructional practices, thereby leading to gains in student learning and ultimately to changes in teachers' beliefs and attitudes. Desimone's (2009) conceptual framework explains how TPD leads to improved student learning outcomes through a causal chain involving changes in teachers' knowledge, skills, attitudes and beliefs as well as instructional practices. Her framework allows for "nonrecursive, interactive pathways" and "operates with context as an important mediator and moderator", including individual student and teacher characteristics, curricula, institutional leadership, and policy conditions (185); however, the relationships among teachers' knowledge, teaching practices and student outcomes constitute a causal chain in which teachers' knowledge and beliefs precede changes in instructional practices (Boylan et al. 2018).

Similar to Gusekey's and Desimone's linear pathway model, Clarke and Hollingsworth's (2002) interconnected model accounts for different components of the teacher change process across four domains, namely, the external domain (external sources of information or stimuli), the domain of practice (professional experimentation), the domain of consequence (salient outcomes) and the personal domain (knowledge, beliefs and attitudes), thus suggesting that TPD occurs through multiple pathways across these four domains. To illustrate the processes of teacher change that link these components across the four domains, TPD is mediated by processes of enactment and reflection "whereby change in one of the above dimensions triggered change in another" (Clarke & Hollingsworth 2002 953). The change environment, particularly the school context, is included in Desimone's model and in Clarke and Hollingsworth's model; however, the latter model accounts for a broader range of external sources of information, such as informal interactions in TPD (Boylan et al. 2018).

Based on a review of the literature on TPD models, including Guskey's, Desimone's and Clarke's and Hollingsworth's work, Opfer and Pedder (2011) developed a model based on complexity theories to address the complex TPD process as well as their concern that a "process-product logic has dominated the literature on teacher learning and that this has limited explanatory ability" (376). Opfer and Pedder's model involves interactions "in different ways and in different intensities to influence teacher learning" (Boylan et al. 2018 126). This model views learning as "a complex system

representing recursive interactions between systems andcomponents that coalesce in ways that are unpredictable but also highly patterned" (Opfer & Pedder 2011 379), thus allowing researchers to predict and explain causal relationships and the possible pathways underlying teacher learning (Boylan et al. 2018)

While the four models discussed above are recognized as significant analytical models that can enhance our understanding of teacher learning, those models are criticized for "the lack of attention given to the situated nature of professional learning" and the fact that teachers are treated "as somewhat decontextualized actors" (Boylan et al. 2018, 133). For example, Guskey's model does not address the environment, whereas Clarke and Hollingsworth's model does not offer specific details regarding the connections between domains. Although Desimone's model includes context as an important mediating and moderating influence on teachers' learning, these models feature only a limited approach to context, such that "the environment is treated as external and static rather than immanent and active" (Boylan et al. 2018 133). While broader systemic factors such as ideology and education policy are included in Opfer and Pedder's model, these influences are underexplored and are "relatively neglected" in that context (Boylan et al. 2018 127). Notably, the incompleteness of these models lies in their failure to address "the influence of wider social forces and ideologies", such as "neoliberalism and discourses of performativity", which are "prevalent in many jurisdictions and influence the construction of PD activity, teachers' engagement in such activity and its outcomes" (Day & Sachs 2004, as cited in Boylan et al. 2018 129).

In addition to the models described above, Sancar et al. (2021) recently proposed a conceptual framework that defines TPD as a dynamic and evolving process in which TPD is grounded in classroom practices. Four interrelated components are subsumed under classroom practices, namely, teacher characteristics, what to teach, how to teach, and student outcomes, all of which significantly influence one another. This framework also specifies that organizational and external factors such as the school context and reforms and policies are relevant to this ongoing process of TPD, thus suggesting a holistic perspective indicating that "the components of the professional development process are interrelated in many ways and are not dependent" (Sancar et al. 2021 8). Sancar et al.'s (2021) recent model suggests the existence of multiple pathways for TPD and posits the interrelatedness of various components of TPD as well as different

contextual factors. However, the existence of important phenomena such as performativity measures is somewhat neglected in this model (Boylan et al. 2018). Additionally, models as such are "not always clear which contexts warrant careful attention and which are overlooked" (Ehrenfeld 2022 490).

3.1. The Need for a New Lens for Examining Teacher Professional Development

The discussion in the above section illustrates the fact that the lack of any consensus regarding the precise definition of TPD and its components as well as its outcomes has led to the emergence of various conceptualizations of TPD (Cirocki & Farrell 2019), thus leading to different models for investigating teacher professional growth. The key aspects of these models are presented in Table 1, which summarizes the critique above, demonstrating that these models may be limited to a complete investigation of TPD in PLCs. While these models suggest that teachers' PD should be identified through processes and activities that enhance teachers' knowledge, skills and attitudes as well as student learning (e.g., Desimone 2009; Guskey 2002), the assumption that these components are "linked by linear one-way or unidimensional relationships" (Boylan et al. 2018, 124) may not be sufficient to support our examination of the complexity of TPD, given their multifaceted and complicated nature (Doğan & Adams 2018). In addition, these models fail to include wider social forces and ideologies such as neoliberalism (Boylan et al. 2018) and their influence on the process underlying TPD. As Bautista & Ortega-Ruiz (2015) noted, researchers have focused mainly on "the micro factors and contexts of PD (e.g., the effect of isolated activities), ignoring influences from the meso (institutional, school system) and the macro factors and contexts (cultural, societal, political, economic)" (246). In fact, the inadequacy of previous PLC research on TPD examining factors beyond the teacher level, organization level or institutional level has been recognized. For instance, Hairon et al. (2017) argued that more research effort is needed to expand our understanding beyond the linear process of TPD to encompass the "intermediary effects of PLCs on school improvement processes that positively influence teacher knowledge, skills, beliefs and practice" (80). These authors also highlighted the importance of exploring the out-of-school contexts that may moderate the relationship between teacher learning in PLCs and student learning as well as the broader national context in which PLCs are shaped and influenced by various political, economic, social, cultural and technological forces.

Therefore, a fresh lens is needed to address the complexity of TPD in PLCs. While teachers' knowledge and beliefs, teaching practices and student learning are considered to represent the core and essential components of TPD (Desimone 2013; Guskey 2002; Sancar et al. 2021), the assumption that these components are "linked by linear one-way or unidimensional relationships" (Boylan et al. 2018 124) is not made by this, thus eliminating the ability of this research to rely on these models. Additionally, studies on TPD in PLCs that consider broader systemic factors, such as political, economic, social, and cultural factors, are lacking.

Therefore, an ecological perspective is well suited for investigating the contextual character of TPD (Tang & Choi 2009). For the purpose of uncovering the complexity of the TPD process within PLCs, TPD is conceptualized as a dynamic and complex process that involves improving teachers' attitudes and beliefs, teacher knowledge, teaching practices and student learning outcomes (Desimone 2009; Guskey 2002; Sancar et al. 2021). This TPD process involving these four components within PLCs is influenced by interactions among a variety of factors at the micro-, meso-, exo-, macro-, and chrono-levels, which can be examined through the proposed ecological model (see table 1).

Table 1. Comparison of the key aspects of the models for investigating TPD

Key aspects	Guskey (2002)	Desimone (2009)	Clarke and Hollingsworth (2002)	Opfer and Pedder (2011)	Sancar et al. (2021)	The proposed ecological model
Components	Teaching practices, students' learning outcomes, and teacher beliefs and attitudes	Teacher knowledge and skills, teacher attitudes and beliefs, teaching practice and student learning	Four domains including the external domain, the domain of practice, the domain of consequence, and the personal domain	A set of nested systems encompassing three subsystems, including the teacher, the school, and the learning system	Teacher characteristics, what to teach, how to teach and students' outcomes	Teacher attitudes and beliefs, teacher knowledge, teaching practice and student learning
Relationship between components	Linear pathway	Linear pathway	Multiple pathways	Interactions occurring within a dynamic set of nested systems	Interrelatedness of various components of TPD	Interactions among various forces in the context of an ecosystem
Conceptualization of TPD	A process involving changes in teaching practice, resulting in gains in student learning and ultimately influencing teachers' beliefs and attitudes	A cause-and-effect pathway encompassing changes in teacher knowledge and skills, teacher beliefs, and teaching practice, resulting in enhanced student learning	A process occurring through multiple pathways across the four domains	An intricate system comprising interrelated systems and components	A dynamic and evolving process of TPD encompassing the four interrelated components subsumed under classroom practices	A dynamic and complex process involving teachers' attitudes and beliefs, teacher knowledge, teaching practices and student learning
Factors influencing TPD	The environment factor not addressed	The environment treated as an external and static entity rather than an active force	Lack specific details regarding the connections between different domains	Wider social forces underexplored	An ambiguity in identifying contexts of significance and neglect	Shaped by the interplay of various forces at the micro-, meso-, exo-, macro-, chrono-levels

consider the entire ecological system in which growth occurs, which is conceptualized as five nested sub-systems including the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner 1979, 2005). Bronfenbrenner (2005) emphasizes not only the significance of various system levels within the ecological context in molding and impacting human development but also the "progressive, mutual adaptation" that takes place throughout individuals' lives as they interact with the evolving properties of the settings in which they are situated, which are influenced by the relationships between these settings and the broader context. This orientation underscores the role of individuals in their development, along with their dynamic relationships, interdependence, and interaction with their surroundings, highlighting the reciprocal relationships and bi-directional interactions between individuals' development and their environments (Bronfenbrenner 2005). Since teachers' professional actions are "embedded in local contexts, visual in relational interactions, ethical and political in nature and involving multiple layers of knowledge, judgment, and influences from the broader societal context" (Dalli et al. 2012 8), this theory provides valuable understanding for studying complex processes of TPD through teachers' interactions with their changing ecological environments.

Although Bronfenbrenner's ecological systems theory has been commonly employed as a framework in the contexts of child development and school settings (Mclinden 2017), it has been increasingly utilized as a theoretical foundation to guide empirical studies on teacher education in various settings (Ren & Zhou 2023), for example, the environmental factors of novice teacher retention in Israel (Zavelevsky & Lishchinsky 2020) and the influence of ecological context on the PD of teacher educators in South Korea (Hwang 2014), as well as in TPD (Carpenter et al. 2022; Ehrenfeld 2022). In recent years, ecological systems theory has gained popularity in the realm of EFL research and has been adapted to investigate the dynamic interaction between ecological systems and EFL teachers' buoyancy (e.g., Liu et al. 2022), young EFL teachers' emotions and identity construction (Nazari et al. 2023), EFL teachers' motivation in career development (Ren & Zhou 2023), EFL university lecturers' lived PD experiences (Ngo et al. 2022), and EFL teachers' professional learning in an overseas setting (Wu & Liu 2024). These empirical studies highlight the effectiveness of ecological systems theory in revealing the intricacies of EFL teachers' developmental paths (Liu et al. 2022; Wu & Liu 2024), underscoring the interconnected nature of learning experiences and how

they can be reflected or strengthened across different levels within the ecological system (Wu & Liu 2024). Hence, this theory is considered appropriate and can offer valuable insights for examining EFL teachers' PD through their engagement with ecological environments.

4. A Proposed Theoretical Framework for Studying EFL Teachers ' PD in PLCs

The proposed theoretical framework of this paper utilizes Bronfenbrenner's (1979, 2005) ecological systems theory which emphasizes not only the impact of the system on the individual but also the reciprocal influences of individuals on the environment. The proposed framework is also adapted from Ehrenfeld's (2022) and Carpenter et al.'s (2022) ecological frameworks which were adopted to examine TPD and the continuity and change in professional learning networks across schools, respectively. The adaptation from Ehrenfeld's (2022) and Carpenter et al.'s (2022) frameworks is rooted in their shared research focus with the present study. Apart from the commonly shared ecological perspective, the proposed framework draws on Carpenter et al.'s (2022) conceptualization of "a complicated interplay between educators, schools, professional communities, and the larger social contexts surrounding them" (87) and Ehrenfeld's (2022) emphasis on "interconnected influences from different levels of teachers' learning ecologies" (494). However, the proposed framework enhances Carpenter et al.'s and Ehrenfeld's frameworks in three aspects to better suit the study of EFL teachers' PD in PLCs.

First, to more effectively fulfil the objective of understanding the immediate settings in which EFL teachers engage, the focal microsystem is the PLC setting, where EFL teachers' interactions with other individuals, such as other PLC members and facilitators and dynamics within the PLC, are regarded as microsystem factors. Second, as the extent of PLC development at different school levels within different subject-related communities may yield distinct effects on teachers' learning outcomes (Stoll et al. 2006), EFL teachers' interactions and dynamics with other variables such as school administrators (Ehrenfeld 2022) and curriculum design and innovation (Englert et al. 1993; Thompson & Woodman 2019) at the school level are given due consideration in the mesosystem, where the focal interest is the institutional contexts of the school. This emphasis helps illustrate how PLC development in EFL teachers' PLCs at different school levels may have different impacts on TPD, contributing to the gap in

research on TPD in PLCs. Third, Carpenter et al.'s and Ehrenfeld's

frameworks are enriched by the inclusion of the chronosystem, which enables the observation of how past experiences influence subsequent development over time, either individually or sequentially (Bronfenbrenner 2005). By incorporating this temporal layer, the model can account for not only the immediate connections between teachers and their PLC settings but also how these interactions shape professional developmental trajectories across time. Notably, TPD is conceptualized as "a dynamic and complex process" in this model, and incorporation of the chronosystem may optimize the model and enhance its robustness.

Inspired by Bronfenbrenner's ecological systems theory (1979, 2005), Ehrenfeld's (2022) and Carpenter et al.'s (2022) frameworks, the interaction of EFL teachers' PD with each level of the system in the proposed ecological model is as follows and outlined in Figure 1:

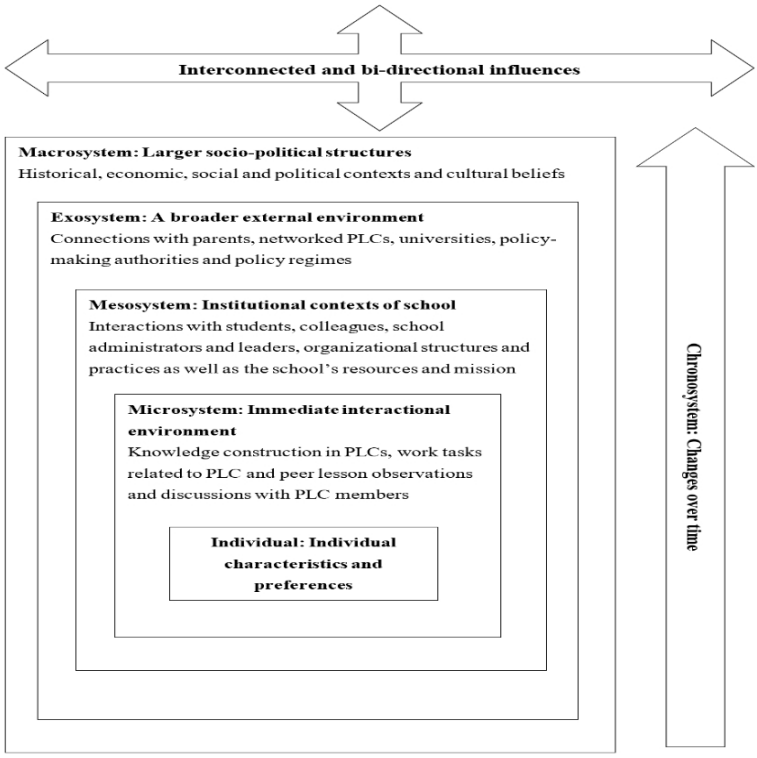

Figure 1. An ecological model of interconnected forces operating at different levels regarding the study of TPD in PLCs. Adapted from: Nadav Ehrenfeld. "Framing an Ecological Perspective on Teacher Professional Development." Educational Researcher, vol. 51, no. 7, 2022, pp. 489-95.

Teachers are positioned at the center of a series of concentric circles. Teachers' individual attributes and preferences can shape and elicit changes in their PLC experiences (Carpenter et al. 2022). Each individual teacher does not lack agency; instead, each teacher is central to the ecological understanding of the PLCs with which teachers engage to obtain contextual affordances for their PD (Carpenter et al. 2022). For example, a teacher may develop new professional interests and therefore endeavor to discover opportunities to meet new people, explore spaces or utilize tools related to those interests (e.g., Richter et al. 2011).

The microsystem refers to the immediate environment in which people engage (Ehrenfel 2022). Since the objects of this model are EFL teachers in PLCs, the main microsystems of interest include their interactions with other PLC members, their work tasks in relation to PLCs, peer lesson observations and discussions with other PLC members, which may influence their PD to varying degrees. For example, teachers may participate in a PLC to collaborate and share their ideas with colleagues and thus improve their teaching practices (e.g., Yin et al. 2019). On the basis of interactions with teachers in the context of PLCs, teachers may experience PD through a continuous process of knowledge co-construction (Ehrenfeld 2022).

The mesosystem connects two or more microsystems (Bronfenbrenner 1979) and includes interactions occurring across microsystems (Price & McCallum 2015). The mesosystem included in this model encompasses the institutional contexts of the school, including various interactions at the school level that influence the educational environment (Ehrenfeld 2022). Such interactions include teachers' classroom experiments with students in their classrooms; interactions among various roles and relationships, including those pertaining to students, colleagues, school administrators and leaders; instructional and organizational practices; and school resources (Ehrenfeld 2022). The mesosystem also encompasses other factors such as curriculum design and renovation (Englert et al. 1993; Thompson & Woodman 2019). These

elements collectively shape the immediate context and experiences within the school setting, impacting the reciprocal interactions and development of individuals within the educational environment.

The exosystem can be interpreted as an extension of a mesosystem and encompasses a broader external environment (Yao et al 2023). Although teachers may not engage in direct interaction with environmental factors, these environmental factors may influence them within their microsystems (Price & McCallum 2015). In this model, the exosystem includes connections with parents (Price & McCallum 2015), networked PLCs, universities (Ehrenfeld 2022), as well as policy-making authorities and policy regimes (Carpenter et al. 2022). For example, due to the influence of neoliberalism, policymaking authorities that prioritize accountability in terms of standardized test results may either encourage or discourage teachers' involvement in PLCs and their schools as a whole (e.g., Hursh 2007).

The macrosystem embodies socio-political structures (Ehrenfeld 2022) (e.g., historical, economic and legal) and cultural beliefs that can have ripple effects on teachers' microsystems (Carpenter et al. 2022). For instance, culture can impact the degree to which schools emphasize equity and inclusion; thus, schools may prioritize PLCs that focus on culturally relevant practices, thereby affecting teachers' understanding of those practices (e.g., Cavazos et al. 2024).

The chronosystem refers to "all environmental and major life changes influencing the developing person over the lifetime" (Başar et al. 2023 2). It recognizes the impact of time on environments and interactions within the ecological system, (Duchesne et al. 2013), encompassing life transitions, significant events, and societal changes as individuals develop (Guo & Lee 2023). In this model, EFL teachers may undergo changes in teaching methodologies over time such as the use of information technology in English language teaching and significant social occurrences at different stages such as the COVID-19 pandemic, resulting in varying degrees of PD as time progresses (Guo & Lee 2023).

The proposed ecological model accounts for the complexity of teachers' work and recognizes that teachers operate in diverse contexts while simultaneously acknowledging the interconnected interactions and influences between the various layers of the ecosystem. Therefore, on the

basis of the ecological framework, researchers can interpret individual teachers' development and interactions with other individuals and the environment in light of the goal of revealing how their PD in PLCs is shaped by the reciprocal interactions among various influences and forces at the micro-, meso-, exo-, macro- and chrono-levels.

5. Conclusion

Despite the absence of empirical data, this paper resembles the theoretical work of Ehrenfeld (2022) and Hairon (2017) in that it offers a conceptual framework that is based on clear rationales and is well grounded in the extant literature as well as in previous studies and models. This proposed model makes a theoretical contribution to the body of research in this area by adopting an ecological perspective on TPD in PLCs, thus progressing beyond the level of linear, interconnected and complex models of TPD by emphasizing reciprocal relationships and bi-directional interactions between individuals' development and their environments (Bronfenbrenner 2005). This model offers a theoretical lens for examining how TPD in PLCs is influenced by interactions among various factors at the micro-, meso-, exo-, macro-, and chrono-levels. It provides not only an improved understanding of the complex process of teacher change and the dynamic interactions between EFL teachers' PD and their evolving environments but also a framework that offers significant potential to guide the efforts of future researchers to broaden the horizons of PLCs through hermeneutic inquiry (Chiang et al. 2024).

By utilizing this model, researchers can obtain empirical findings pertaining to the interactions among the factors affecting TPD in PLCs. Studies have increasingly shown that engagement in learning activities by collaborating with PLC members contributes to the development of teachers and their ability to make changes (Tam 2015). However, relatively few studies have investigated the ways in which different factors affect changes in or the development of teachers due to their participation in PLCs. This topic deserves investigation because when organizational learning is flexibly restructured, teachers have more opportunities to engage in cooperative learning and PD and are more motivated to exploit their professional autonomy, such as their control over the curriculum and participation in decision-making, thus leading to increased professional growth (Ko et al. 2016).

In addition, as discussed above, although teacher collaboration

through PLCs has been shown to have positive effects on efforts to improve teaching and student learning success effectively in a global context (Akiba & Liang 2016; Dogan et al. 2016), these studies have focused mainly on the effects of mathematics PLCs, science PLCs or mixed-subjects PLCs, whereas studies on the effects of English PLCs in primary schools are lacking. Since the process and effects of EFL teachers' PLCs may differ from those of PLCs in other disciplines, extending the scope of this topic beyond the level of previous research to investigate the effects of PLCs on EFL teacher education, particularly regarding how EFL teachers develop their knowledge and teaching practices through participation in PLCs, as well as the factors that support and constrain this phenomenon within PLCs, is necessary. The findings derived from this model can expand our current understanding of EFL teachers' development in PLCs.

Finally, this model helps generate practical knowledge about how to facilitate EFL teachers' PD through PLCs. Schools should develop and refine processes and practices for learning organizations to ensure that they can establish the conditions needed to sustain the quality of teacher learning (Opfer & Pedder 2011). However, the extent to which PLCs can develop effective support organizations that can facilitate change for teachers is not entirely clear (Maloney & Konza 2011). Therefore, it is necessary to investigate how PLCs transform EFL teachers' existing beliefs and practices. As Clarke and Hollingsworth (2002) noted, "If we are to facilitate the professional development of teachers, we must understand the process by which teachers grow professionally and the conditions that support and promote that growth" (947). This model will offer significant value for individuals seeking to provide professional support to schools and to school administrators and leaders.

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