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FACTORS AFFECTING TEACHERS' ENGAGEMENT IN CONTINUING PROFESSIONAL DEVELOPMENT

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Abstract

The aim of this study was to explore the dynamics of teachers' engagement in continuing professional development (CPD) and identify key predictors of engagement. Data were collected from 431 primary and secondary school teachers in China using a mixed-methods approach that included questionnaire surveys and semi-structured interviews. The findings of this study underscore how teachers' distinct needs for competence, relatedness, and autonomy impact the quality of their engagement, consequently influencing their professional development outcomes. Through factor analysis, this study identified four clusters of predictive factors for teachers' professional development engagement: cognitive factors, instrumental factors, self-actualizing factors, and factors related to the CPD culture. Remarkably, teachers' years of experience and qualification levels are linked to all instrumental factors. This research stands as a pioneering effort to examine teachers' engagement within the context of CPD in China. The identified variations in teachers' engagement behaviors and attitudes offer valuable insights for policymakers and school leaders, facilitating a deeper comprehension of the underlying mechanisms of engagement factors and their corresponding impact on teachers' professional growth. This research substantially contributes to the theoretical advancements in understanding teacher engagement dynamics.

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Keywords: Teachers' engagement in continuing professional development, teachers' engagement factors, self-determination theory

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1. Introduction

Teacher continuing professional development (CPD) studies traditionally focus on evaluating the effectiveness of CPD programs and identifying key elements that lead to positive outcomes (Borko *et al*., 2010). However, the reality of CPD encompasses a wide range of educators, from experienced professionals to novices, each with unique learning needs, timing preferences, and delivery mode preferences (Ying, 2021). As highlighted by Desimone and Garet (2015), the diversity of teacher responses often results in varying student outcomes. Kahn's terminology of "personal engagement" and "disengagement" (1990, 2010) aptly captures these variations.

Research consistently demonstrates a positive correlation between teacher engagement and improved teaching performance (Bakker & Bal, 2010). Engaged educators tend to actively contribute beyond their classrooms, benefiting the school community (Parker & Martin, 2009). However, limited research has explored the interplay of internal and external factors that shape teachers' motivation to participate in CPD initiatives. This study aims to address this gap by investigating the complexities of teachers' engagement within CPD contexts, with a specific focus on the Chinese educational landscape.

In the context of China's educational settings, a substantial body of literature centers on enhancing teaching expertise through school-based teaching research group (TRG) activities (Huang et al., 2017). These activities encompass various elements, such as lesson planning, peer observations, mentoring, coaching, and different levels of training and workshops (Chen, 2020). While TRGs provide ongoing support for professional growth, they also face criticism for reinforcing traditional teaching practices and inhibiting innovative approaches. The hierarchical structure of professional learning communities, as observed in Hairon and Tan's (2017) study on Shanghai, presents challenges to collaborative efforts. Moreover, the evolution of TRGs beyond professional development into school administration and teaching management, particularly since the curriculum reform in 2001 (Chen & Zhang, 2019), has transformed their dynamics, making participation in TRG activities a mandatory requirement closely linked with teacher evaluation.

This study has two primary objectives: first, to explore the spectrum of teachers' engagement in diverse CPD activities, and second, to identify the influential factors contributing to their engagement levels. To achieve these objectives, the research addresses the following research questions:

RQ1: Does teachers' engagement in CPD vary across different activities?

RQ2: What factors influence teachers’ engagement in CPD?

RQ3: To what extent is teachers' engagement in CPD related to variables such as gender, years of teaching experience, and professional qualification levels?

By addressing these questions, this study seeks to provide a nuanced understanding of teachers' engagement dynamics within CPD settings, particularly within the distinctive educational context of China.

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2. Literature Review

2.1. Teacher professional development

In recent years, research has illuminated the critical components of effective CPD programmes (Borko *et al*., 2010; Garet *et al*., 2001). Darling-Hammond et al. (2017) conducted a comprehensive review, identifying seven key attributes shared by successful CPD programmes: (1) a strong content focus; (2) active learning methods; (3) support for collaborative learning; (4) use of effective teaching practice models; (5) provision of coaching and expert guidance; (6) opportunities for reflection and feedback; and (7) sustained duration. They stress that the effectiveness of teacher CPD depends on school and system-wide conditions. Active support and enthusiasm from school leaders are pivotal in inspiring teachers to embrace new ideas, activities, and curricula introduced during CPD (Desimone, 2009).

Moreover, creating safe and supportive environments for teachers is consistently emphasized in the literature. In such settings, educators are more willing to take risks, engage in challenging discussions, deepen their understanding, and experiment with innovative practices (Dudley, 2013; Vermunt *et al*., 2019).

Fraser et al. (2007) argue that effective teacher CPD should not solely address occupational needs, such as technical knowledge, but also consider personal aspects, including beliefs, values, interests, and motivation, as well as social aspects, including relationships and contextual factors. Kennedy and McKay (2011) expand on this, emphasizing that CPD primarily focused on technical aspects can limit professional autonomy and encourage replication and compliance.

Against this backdrop, this study explores attitudinal development within the context of CPD, particularly in primary and secondary school settings in China. China's educational management system and overall structure are often described as hierarchical and collectivist (Hairon & Tan, 2017). This research seeks to understand how attitudinal development can be facilitated in a context defined by these distinctive features. By doing so, it offers valuable insights into the intricate landscape of teacher CPD within this unique educational context.

2.2. Teacher engagement in continuing professional development

2.2.1. Conceptualization of engagement

Despite extensive research, the conceptualization of engagement remains a subject of ongoing debate. Kahn (1990) introduced engagement as the "harnessing of organization members' selves to their work roles," involving active physical, cognitive, emotional, and mental expression during role performances (Kahn, 1990, p. 694). It's seen as a dynamic, dialectical relationship between individuals investing their personal energies in their work roles and roles offering opportunities for self-expression (Bakker *et al*., 2008). Engagement is expected to yield positive outcomes at both the individual (personal growth and development) and organizational (enhanced performance quality) levels (Hakanen *et al*., 2006).

Teachers' engagement shares similarities with general work engagement, encompassing behavioral, emotional, and cognitive dimensions (Saks, 2006; Schaufeli & Bakker, 2010). However, teaching involves a unique demand for social engagement, as it requires dedicating energy to nurturing long-term, meaningful relationships with students (Pianta *et al*., 2012). Author (2021) expanded upon this by proposing and

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investigating four distinct types of teachers' engagement within CPD: behavioral, emotional, cognitive, and social engagement (see Table 1). Author also highlighted the reciprocal effects observed between teachers' engagement in CPD and their teaching achievements: heightened engagement in professional learning contributes to improved teaching performance, while enhanced teaching efficacy fosters increased engagement in subsequent professional development activities.

Table 1. Types of teachers' engagement in professional development (from Author, 2021)

Types of CPD Engagement	Definition
Behavioural Engagement	Referring to teachers' active participation in various forms of CPD learning. It encompasses behaviors such as putting in effort, demonstrating persistence, maintaining concentration, paying attention, and actively contributing to discussions.
Emotional Engagement	Referring to teachers' emotional responses within the context of CPD. It encompasses feelings of interest, enthusiasm, enjoyment, and a sense of belonging that teachers experience during their participation in CPD activities.
Cognitive Engagement	Referring to the mental and psychological investment that teachers make in their learning during CPD. It includes aspects like valuing the learning experience, cultivating self-efficacy, practicing self-regulation, and setting goals to enhance their professional development.
Social Engagement	Referring to teachers' moral and social values as they engage in CPD. It involves the pursuit of a professional identity and vision, where teachers align their values with those of their professional community and actively contribute to the development of the broader educational field.

2.2.2. Theoretical framework: Self-determination Theory (SDT)

This study adopts Self-determination Theory (SDT, Deci & Ryan, 1985; Ryan & Deci, 2017) as its theoretical foundation to investigate the drivers of teacher engagement. SDT posits that employees' performance and well-being are influenced by the type of motivation underpinning their job activities. It distinguishes between different motivations, particularly highlighting autonomous motivation (intrinsic and fully internalized extrinsic motivation) and controlled motivation (externally and internally controlled extrinsic motivation). Research has shown that teachers' autonomous motivation is shaped not only by supportive or inhibiting school factors but also by their long-term personal development and identity (Roth, 2014).

Within SDT, Deci and Ryan (2000) identify three fundamental "innate psychological needs" derived from Connell's self-system model (Connell, 1990): (1) the need for competence (striving for optimal challenges and mastering the physical and social world), (2) the need for relatedness (desire for attachments, security, and belongingness with others), and (3) the need for autonomy (the drive to self-organize and regulate one's behavior). SDT suggests that when these needs are met, individuals are more likely to be fully engaged in their roles (Deci & Ryan, 2000).

Past studies (Ryan & Deci, 2017; Van den Broeck et al., 2016) have affirmed that either autonomous motivation or the satisfaction of these basic psychological needs predicts positive work-related outcomes.

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Thus, understanding the antecedents of these motivational experiences is crucial for comprehensively promoting high-quality performance within educational organizations.

2.2.3. Antecedents of teacher engagement in CPD

Several studies have explored the factors influencing teachers' engagement. For instance, in a Dutch survey, Geijsel et al. (2009) identified three key sets of elements contributing to variations in teachers' professional learning: (1) teachers' psychological states, (2) school organizational conditions, and (3) school leadership practices. Notably, they emphasized the significant impact of psychological factors, particularly how teachers internalize school goals into personal goals, on their engagement. In a Canadian context, Picard and Kutsyuruba (2017) highlighted the pivotal role of colleagues in teachers' CPD engagement within a collaborative school culture. They found that robust leadership and conducive physical structures for collaboration also played significant roles in fostering engagement.

Within primary and secondary schools in China, Dong et al. (2019) examined factors influencing self-efficacy and engagement in STEM teaching in China. They identified teaching self-efficacy, pedagogical design self-efficacy, and collegial support as predictors of teacher self-efficacy and engagement. Additionally, discipline knowledge and administrative support positively influenced teaching self-efficacy, which, in turn, affected teacher engagement. Ke et al. (2019) found that teachers' willingness to attend CPD, along with supportive principal leadership, facilitated participation in CPD activities. Notably, they emphasized that collective lesson planning and teacher collegiality, rather than participation frequency, enhanced teacher efficacy and the adoption of effective teaching strategies.

Despite these valuable insights into teachers' general engagement, research on the interaction between the social and individual dimensions of teacher engagement remains relatively undeveloped. Particularly within the context of CPD, there is a pressing need for further exploration of how specific dimensions—behavioral, emotional, cognitive, and social engagement—evolve during teacher CPD and translate into professional practice. Consequently, this study aims to critically investigate and comprehend teachers' engagement within both individual and social dimensions.

3. Methodology

3.1. Participants

The study involved 431 teachers (91.2% female; 8.8% male) from five different primary and secondary schools in China. Participants held various professional qualifications: associate degree (15%), bachelor's degree (70%), and master's degree (15%). Teaching experience ranged from 1-2 years (23%), 3-5 years (24%), 6-10 years (20%), 11-15 years (14%), 16-20 years (5%), and 21 years or more (14%). Additionally, 27 teachers from this sample participated in semi-structured interviews.

3.2. Data collection

To address the research questions, the study employed both questionnaire surveys and semi-structured interviews, adhering to the principle of methodological triangulation (Cohen *et al*., 2018).

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3.2.1. Questionnaire

For RQ1, a scale was used to assess teachers' evaluations of eight common CPD activities within the research context. Teachers indicated their engagement in these activities over the past 18 months on a 4-point Likert scale (1= no engagement, 4 = high engagement). Cronbach's alpha for this section was .900. Subsequently, participants rated the perceived impact of each activity on their teaching on a 4-point scale (1 = no impact, 4 = large impact). Cronbach's alpha for this section was .897, indicating strong reliability and validity.

To address RQ2 and RQ3, a teacher CPD engagement factor scale gauged seven CPD environmental characteristics, five teacher self-efficacy characteristics, three CPD content characteristics, and three CPD leader/trainer characteristics. These items were derived from the literature reviewed earlier. Participants rated the impact of these factors on their engagement in CPD on a 5-point scale (1 = no impact, 5 = great impact). Cronbach's alpha for this section was .919. An open-ended item allowed participants to identify additional influencing factors.

3.2.2. Semi-structured interviews

Interviews delved into participants' recent CPD experiences, explored their engagement, and examined its impact on classroom practice. Factors influencing engagement and any changes across career phases were discussed.

Informed consent was obtained from all participants before data collection. Instruments and the interview guide underwent peer-review and pilot-testing, with adjustments based on feedback to ensure clarity. The survey was administered first, followed by individual school site interviews lasting 10 to 15 minutes. Probing questions were used to explore topics in depth, and participants were encouraged to share additional insights at the interview's conclusion.

3.3. Approach to analysis

For questionnaire data, SPSS was used to conduct both descriptive and inferential statistics. Descriptive statistics assessed rankings, means, and variations in self-reported engagement and perceived CPD activity impact for the entire sample. Factor analyses were performed for items related to CPD activity content, CPD session leaders, teacher self-efficacy, and CPD environmental variables. Factors were determined based on eigenvalues (>1), factor interpretability, and the proportion of explained variance. Oblique rotation was employed, with items requiring a minimum factor loading of 0.40 in the rotated solution. Factor reliability was assessed, and item-characteristic curves were examined for monotonous respondent score increases. T-tests and ANOVA were conducted to explore potential response differences based on gender, qualification levels, and years of working experience.

Regarding interviews, the author recorded and transcribed them. Thematic coding (Creswell & Creswell, 2018) was employed for analysis, incorporating deductive and inductive categories. Deductive categories were derived from the literature on engagement, while inductive categories emerged from the interview data. An illustration of thematic categories, emerging themes, and initial codes can be found in

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Table 2. Multiple steps were taken to ensure coding validity and reliability, including member checking, peer debriefing, and external audit.

Table 2. The example of thematic category and emerging themes and initial codes

Categories	Emerging themes and codes	Interview examples	Coding examples
Reducing Job Demands	[I] A Relieving physical stress [I] A1 Assuring the subject teaching points [I] A2 Delivering the appropriate teaching methods [I] A3 Being familiar with teaching curriculum [I] A4 Being helpful in classroom management [I] A5 Achieving significant growth	When I attend a regular TRG discussion meeting, my group leader will guide us to go through the subsequent teaching content. We always have a quick overview first, then everyone expresses their own thoughts. As a new teacher in this group, I am supposed to briefly present my main teaching steps, and other teachers provide their feedback on my teaching plan. Then, I will refine or adjust my teaching design…No matter how busy we are, we must spare the time for group discussion. (Teacher 04, 1-2 years of teaching experience)	[I] A1 [I] A3
	[I] B Relieving emotional/mental stresses [I] B1 Feeling confident in classroom teaching [I] B2 Feeling confident in answering parents' inquiries [I] B3 Having a clear knowledge on examination reform [I] B4 Having control over teaching tasks	I was very engaged in the district TRG meeting on examination reform held last month. The most important reason is that many parents have asked me this question. They are eager to know what are the exact differences between the existing examination and the new one? I think it is quite important for me to have a clear knowledge on this issue before replying to parents. (Teacher 14, 1-2 years of teaching experience)	[I] B2 [I] B3

3.4. Ethical considerations

This study adhered to ethical guidelines throughout. It followed the research ethics checklist of the University of Cambridge Faculty of Education and the Ethical Guidelines for Educational Research by the British Educational Research Association (2011). Participants granted informed consent before data collection, and interviewees reconfirmed their willingness to participate.

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4. Results

4.1. Variations in teachers' engagement in different PD activities

Table 3 presents a summary of teachers' engagement and perceived impact across eight CPD activities. Engagement mean scores ranged from 3.09 (SD=0.76) to 3.43 (SD=0.69), indicating varying levels of engagement. Perceived impact mean scores ranged from 3.10 (SD=0.76) to 3.36 (SD=0.69). Notably, all scores exceeded 3.0, underscoring the importance of these activities in teachers' CPD.

The most popular activities were *informal dialogue on teaching* (97.7%) and *peer observation with feedback* (96.5%), while *CPD network* (41.1%) and *reading professional journals* (55.9%) were less favored. Interestingly, the ranking of perceived impact closely mirrored that of engagement, but the ranking of participation diverged.

Table 3. Descriptive statistics of CPD activities

CPD activities	Engagement			Impact			Participation	
	M	SD	Rank	M	SD	Rank	Percent	Rank
Overall average for all CPD activities	3.27	0.71	n/a	3.21	0.73	n/a	77.4	n/a
Peer Observation with Feedback	3.43	0.69	1	3.31	0.71	2	96.5	2
Informal dialogue on teaching	3.41	0.71	2	3.36	0.69	1	97.7	1
Mentoring and Coaching	3.36	0.69	3	3.26	0.74	3	92.5	4
Network of teacher CPD	3.29	0.70	4	3.24	0.71	4	41.1	8
Courses and Workshops	3.25	0.64	5	3.18	0.71	5	93.2	3
Education Conferences	3.20	0.68	6	3.13	0.70	6	84.5	5
Qualification Programmes	3.16	0.78	7	3.13	0.82	6	58.1	6
Reading Professional Journals	3.09	0.76	8	3.10	0.76	8	55.9	7

Notes: Rating scale for Engagement: 1= No engagement, 4=High engagement; Rating scale for Impact: 1=No impact, 4= Large impact

4.2. Factors of teachers' engagement in CPD

4.2.1. Questionnaire survey results

Table 4 displays mean scores for eighteen components influencing teachers' engagement in CPD. *Student feedback* received the highest mean score (M=3.95, SD=.830), indicating its significant impact. Conversely, *work responsibility and role duty* received the lowest mean score (M=3.38, SD=1.063), suggesting a potentially lesser influence.

Notably, three components had standard deviations (SD) exceeding 1.0: *a change in salary level* (SD=1.116), *monetary rewards for achievements* (SD=1.092), and *work responsibility and role duty* (SD=1.063). These higher SD values suggest varying opinions among respondents regarding tangible incentives and job duties. Surprisingly, *student test scores* (M=3.52, SD=.993) were perceived to have less influence on enhancing teachers' engagement compared to *student feedback* (M=3.95, SD=.830).

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Table 4. Mean scores on components influencing teachers' engagement in CPD

	n	M	SD
Student feedback	431	3.95	0.830
School leadership and mechanism support	430	3.91	0.866
Public recognition for contribution	430	3.85	0.889
Student parent feedback	430	3.82	0.894
CPD form focusing on demonstrating knowledge and skills	429	3.82	0.897
Collegial community climate	430	3.81	0.870
A change in salary level	431	3.77	1.116
CPD trainer's integration of theory and practice	430	3.77	0.916
Likelihood of career advancement	427	3.74	0.992
Peer feedback	430	3.74	0.872
CPD leader's passion and influence	430	3.73	0.876
CPD trainer's expertise and experience in the area	429	3.72	0.899
CPD content focusing on class curriculums	428	3.70	0.884
Other student learning outcomes	430	3.69	0.921
Consistency between CPD content and individual needs	428	3.67	0.919
Monetary rewards for achievements	421	3.53	1.092
Student test score	430	3.52	0.993
Work responsibility and role duty	429	3.38	1.063

Notes: Rating scale: 1= No impact, 2=Low impact, 3=Moderate impact, 4=High impact, 5=Great impact

Factor analysis was conducted since mean scores for all components surpassed 3.0. Table 5 displays the results of the factorial analysis, revealing four distinct factors that collectively accounted for 69.19% of the variance:

Intellectual Factors: Comprising five items related to teachers' cognitive development of knowledge and skills as learners in professional learning.

Self-actualizing Factors: Encompassing six items focused on the outcomes of teaching practice, reflecting teachers' realization of personal growth and self-fulfillment.

Instrumental Factors: Consisting of four items concerning the concrete benefits and obligations of teachers' efforts as members of an organization.

PD Cultural Factors: Pertaining to the CPD culture and climate, spanning activity, teacher community, and school leadership levels, comprising three items.

Table 5. Factor loadings of components influencing teachers' engagement in CPD

	Factor 1	Factor 2	Factor 3	Factor 4
CPD trainer's integration of research and practice	0.844	0.015	0.005	0.021
Consistency between CPD content and individual needs	0.824	0.021	0.052	-0.037
CPD trainer's expertise and experience in the area	0.740	-0.078	0.011	0.253
CPD form focussing on demonstration of knowledge	0.728	0.172	0.053	-0.021
CPD content focussing on teaching curriculum	0.619	0.187	0.138	-0.021
Student feedback	0.050	0.847	0.032	-0.065
Peer feedback	-0.072	0.823	0.001	0.055
Student parent feedback	0.050	0.805	0.065	-0.041

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Student test score	0.013	0.713	-0.080	0.102
Student other learning outcomes	0.216	0.708	-0.118	0.022
Public Recognition for contribution	-0.145	0.575	0.376	0.079
A change in salary level	-0.004	-0.051	0.884	0.064
Monetary rewards for achievements	-0.142	-0.003	0.842	0.164
Likelihood of career advancement	0.303	0.014	0.689	-0.094
Work responsibility and role duty	0.195	0.112	0.672	-0.065
Collegial community climate	0.056	0.068	0.051	0.847
School leadership and mechanism support	0.045	0.086	0.077	0.833
CPD leader's passion and influence	0.571	-0.017	-0.028	0.461

Table 6 presents mean scores and reliability analyses for these four factors, demonstrating their respective contributions to teacher engagement. CPD Cultural Factors received the highest mean score (M=3.82, SD=0.871), while Instrumental Factors received the lowest (M=3.61, SD=1.066). Table 7 reveals the correlations between these engagement factors and eight CPD activities, highlighting varying degrees of influence across factors and activities. Some Instrumental Factors showed minimal direct effects on CPD activities, suggesting their relatively lower impact on engagement compared to other factors.

Table 6. Descriptive statistics of teacher CPD engagement factors

Teacher Engagement Factors	Alpha	n	M	SD
Intellectual Factors	0.882	429	3.74	0.903
Self-actualizing Factors	0.873	430	3.76	0.900
Instrumental Factors	0.842	427	3.61	1.066
PD Cultural Factors	0.833	430	3.82	0.871

Notes: Rating scale: 1= No impact, 2=Low impact, 3=Moderate impact, 4=High impact, 5=Great impact

Table 7. Correlations between teacher engagement factors and eight CPD activities

Teacher CPD Engagement Factors	Courses/ Workshops	Education conference	Qualification program	Mentoring/ Coaching	Peer observation	PD network	Informal dialogue	Professional literature
Intellectual Factors								
CPD trainer's integration of research and practice	0.211**	0.129*	0.247**	0.172**	0.128*	0.252**	0.064	0.172**
Consistency between PD content and individual needs	0.236**	0.195**	0.200**	0.155**	0.143**	0.271**	0.051	0.173**
CPD trainer's expertise and experience in the area	0.144**	0.142**	0.164*	0.198**	0.094	0.330**	0.109*	0.075
CPD form focussing on demonstration of knowledge	0.190**	0.109*	0.139*	0.223**	0.174**	0.241**	0.153**	0.190**
CPD content focussing on teaching curriculum	0.149**	0.160**	0.196**	0.242**	0.190**	0.237**	0.138**	0.205**
Self-Actualizing Factors								
Student feedback	0.191**	0.191**	0.166*	0.242**	0.163**	0.267**	0.167**	0.200**
Peer feedback	0.137**	0.146**	0.105	0.200**	0.279**	0.226**	0.187**	0.165*

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Student parent feedback	0.183**	0.180**	0.099	0.212**	0.152**	0.209**	0.114*	0.174**
Student test score	0.148**	0.203**	0.197**	0.289**	0.250**	0.295**	0.239**	0.293**
Student other learning outcomes	0.223**	0.229**	0.162*	0.273**	0.248**	0.348**	0.236**	0.297**
Public Recognition for contribution	0.192**	0.230**	0.154*	0.253**	0.241**	0.302**	0.191**	0.229**
Instrumental Factors								
A change in salary level	0.001	-0.036	-0.03	0.058	0.028	0.038	0.045	0.003
Monetary rewards for achievements	0.018	0.022	0.022	0.070	-0.005	0.071	0.037	-0.004
Likelihood of career advancement	0.105*	0.021	0.033	0.112*	0.076	0.084	0.058	0.091
Work responsibility and role duty	0.133**	0.149**	0.044	0.164**	0.193**	0.202**	0.087	0.157*
Cultural Factors								
Collegial community climate	0.166**	0.170**	0.144*	0.205**	0.157**	0.230**	0.136**	0.084
School leadership and mechanism support	0.078	0.119*	0.099	0.198**	0.202**	0.150	0.139**	0.105
CPD leader's passion and influence	0.117*	0.104	0.056	0.193**	0.150**	0.294**	0.143**	0.137*

Notes: Correlation is significant at the 0.01 level (2-tailed) **; 0.05 level (2-tailed) *

4.2.2. Semi-structured interview results

The interview findings align with the survey results, shedding further light on how the identified factors influence teachers' professional growth. Notably, similar perspectives emerged among teachers sharing common career phases and statuses.

In the intellectual dimension, younger teachers emphasized the importance of a focused CPD content and format, showing higher engagement when CPD activities demonstrated new methods or had a clear connection to classroom practice. Conversely, a lack of these elements resulted in decreased engagement, as observed by Teacher 06, who pointed out the ineffectiveness of TRG meetings due to a lack of a clear research direction.

Mid-career teachers emphasized the influential role of exemplary leaders on their engagement, emphasizing that a good trainer was as essential to teachers as a good teacher was to students, as mentioned by Teacher 15.

In terms of the self-actualizing dimension, respondents frequently highlighted the significance of student feedback, which had the highest mean score in the survey. They found their efforts meaningful and significant through student feedback, as expressed by Teacher 12. Some older teachers also stressed the importance of public recognition as it represented a sense of value and meaning for their contributions. However, negative feedback from leaders or parents had a demotivating effect.

Regarding the CPD cultural dimension, novice teachers emphasized the critical role of CPD community support in personal learning and growth. Being part of a team and having the freedom to express concerns were deemed essential for their satisfaction. On the other hand, mid-career teachers underscored the importance of an autonomy-supportive community climate. For instance, when discussing unfavorable factors, Teacher 15 explained that standardized teaching practices were demotivating for his engagement, emphasizing the uniqueness and individuality of each teacher.

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The instrumental dimension, primarily related to work responsibility, emerged as a significant factor. Work responsibilities became stressful when they entailed high effort, particularly for primary class teachers (*Banzhuren*, referring to the teacher responsible for students' ideological education and organizational management of the class), who faced heavy demands in research settings. These increasing demands of teaching and administrative responsibilities significantly demotivated their engagement, consistent with the survey data where work responsibility and role duty received the lowest mean score. For some respondents, tangible incentives played a role in engagement, especially when evaluations were linked to salary, as noted by Teachers 24 and 25.

4.3. Impact of teacher variables on PD engagement

The survey data revealed statistical differences in the extent to which respondents were motivated by engagement factors across various groups categorized by teachers' length of teaching service, professional qualification level, and gender. However, the interviews did not provide direct evidence of these variations between groups of qualification levels and gender.

4.3.1. Questionnaire survey results

In the analysis of the questionnaire survey results, ANOVA was conducted to evaluate the impact of teacher qualification levels and teaching experience on engagement factors. The findings revealed notable variations in instrumental factors based on different teacher qualification levels and teaching experience groups, while modest differences were observed in self-actualizing and intellectual factors. CPD cultural factors did not exhibit any significant variations.

Table 8 presents the ratings provided by teachers with associate degrees, revealing consistently lower mean scores across all instrumental factors. This suggests that teachers with associate degrees perceived these factors as having a lesser impact on their engagement. Statistically significant differences were observed between these groups on several instrumental factors: *monetary rewards for achievements* ($F=4.928$, $p<0.01$), *change in salary level* ($F=8.874$, $p<0.001$), *likelihood of career advancement* ($F=10.979$, $p<0.001$), and *work responsibilities and duty role* ($F=5.964$, $p<0.01$).

Analyzing teaching experience, teachers with over 21 years of experience reported the lowest ratings compared to other groups, with mean scores falling below 3.0 for *monetary rewards for achievements* ($M=2.89$, $SD=1.220$) and *work responsibilities and role duty* ($M=2.86$, $SD=1.043$). ANOVA analyses further confirmed significant differences between teaching experience groups in the assessment of several instrumental factors, including *monetary rewards for achievements* ($F=5.348$, $p<0.01$), *change in salary level* ($F=5.664$, $p<0.001$), *likelihood of career advancement* ($F=9.869$, $p<0.001$), and *work responsibilities and role duty* ($F=5.018$, $p<0.01$). These findings highlight the diverse perceptions of instrumental factors among teachers with varying levels of teaching experience.

Concerning self-actualizing factors, a *t*-test analysis revealed that the female group reported significantly greater impacts from *peer feedback* ($t=2.407$, $p<0.05$) and *public recognition for contribution* ($t=2.941$, $p<0.01$) in promoting engagement compared to the male group.

Regarding intellectual factors, ANOVA analyses showed that teachers with 1-2 years of teaching experience were more motivated by *CPD content and individual needs* than those with over 21 years of

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experience (F=3.440, p<0.01). Additionally, the group with 11-15 years of teaching experience showed significantly higher motivation related to *CPD trainers' expertise and experience in the field* compared to those with over 21 years of experience (F=3.021, p<0.05). These findings underscore the influence of gender and teaching experience on teachers' engagement factors.

Table 8. Descriptive statistics of ANOVA analyses on ınstrumental factors

	Instrumental Factors																			
	Monetary rewards for achievements					A change in salary level					Likelihood in career advancement					Work responsibility and role duty				
Education level	n	M	SD	F	MD	n	M	SD	F	MD	n	M	SD	F	MD	n	M	SD	F	MD
Associate degree	61	3.13	1.245	4.928		64	3.25	1.272	8.874		63	3.29	1.128	10.98		64	3.00	1.069	5.964	
Bachelor's degree	291	3.61	1.062			295	3.85	1.095			293	3.77	0.975			294	3.41	1.063		
Master's degree or above	62	3.58	1.033			65	3.95	0.943			65	4.08	0.756			65	3.62	0.979		
Total	414	3.53	1.097			424	3.78	1.123			421	3.75	0.993			423	3.38	1.064		
Multiple comparisons	Associate <Bachelor's				-.477**	Associate < Bachelor's				-.604***	Associate < Bachelor's				-.486**	Associate < Bachelor's				-.415*
						Associate < Master				-.704**	Associate < Master				-.791***	Associate < Master				-.615**
Years of experience	n	M	SD	F	MD	n	M	SD	F	MD	n	M	SD	F	MD	n	M	SD	F	MD
1-2 years	98	3.69	0.957	5.348		100	3.98	0.964	5.664		99	3.97	0.735	9.869		100	3.67	0.911	5.018	
3-5 years	100	3.73	1.062			101	3.88	1.125			101	3.92	0.935			101	3.37	1.146		
6-10 years	85	3.58	1.051			86	3.88	0.938			85	3.80	0.986			86	3.34	1.047		
11-15 years	57	3.53	1.104			61	3.80	1.077			61	3.85	0.980			61	3.57	1.024		
16-20 years	22	3.36	1.093			22	3.64	1.177			22	3.27	1.241			22	3.18	1.097		
21 years and above	57	2.89	1.220			59	3.10	1.373			57	3.02	1.061			57	2.86	1.043		
Total	419	3.53	1.094			429	3.77	1.118			425	3.74	0.994			427	3.38	1.065		
Multiple comparisons	21 or above < 1- 2 years				-.799**	21 or above < 1- 2 years				-.878***	21 or above < 1- 2 years				-.952***	21 or above < 1- 2 years				-.810**
	21 or above < 3-5 years				-.835**	21 or above < 3-5 years				-.779**	21 or above < 3-5 years				-.903***	21 or above < 11-15years				-.714*
	21 or above < 6-10years				-.682*	21 or above < 6-10years				-.782**	21 or above < 6-10years				-.782***					
						21 or above < 11-15years				-.702*	21 or above < 11-15years				-.835***					

Notes: Rating scale: 1= No impact, 2=Lowly impacted, 3=Moderately impacted, 4=Highly impacted, 5=Greatly impacted
***p<0.001 level, 2-tailed; **p<0.01level ,2-tailed; *p< 0.05 level, 2-tailed

4.3.2. Semi-structured interview results

The interview results aligned closely with the survey findings, particularly in relation to teaching experience. Consequently, the interview results have been categorized according to teachers' career phases.

Within the early-career group, encompassing teachers with 1 to 2 years of experience, there was a notable high level of motivation across all engagement factors. This motivation was primarily driven by the urgent need for "teaching competence" and the support offered by "TRG peers" (Teacher 18). However, among teachers with 3 to 5 years' experience, some displayed lower motivation levels. The increasing tensions stemming from a heavy workload and the pursuit of teaching quality considerably dampened their engagement, as illustrated by Teacher 14's experience.

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When I had only two classes in the first year, I had plenty of time to prepare and reflect on my teaching. (…). I even divided my students into personality groups to help their learning. But when I had 6 classes across grades, (…), I had no time." (Teacher 14, 3-year teaching experience)

In the mid-career group, there was considerable variation in self-reported CPD engagement. Many expressed a strong desire for external CPD resources and expert guidance. However, some highlighted a shift in cognitive engagement, transitioning from a focus on content directly related to classroom teaching during their early career to a recognition of the importance of instructional pedagogy after years of practice (Teacher 07, 7-year teaching experience). Nevertheless, those with 16-20 years of experience generally appeared less motivated, often due to increased CPD demands conflicting with family responsibilities, leading to decreased commitment and engagement.

In contrast, respondents at a later career phase (over 21 years of teaching experience) exhibited moderate to low engagement in CPD, with reduced motivation in instrumental and intellectual factors. “Performance evaluations felt chaotic”, and CPD activities were viewed as “additional burdens” (Teacher 03). Nonetheless, they remained motivated when receiving positive feedback from peers.

5. Discussion

5.1. Variations of teachers’ engagement in different CPD activities

The study revealed significant variations in teachers' engagement across different CPD activities, a consistent finding supported by both the survey and interviews. Notably, this variation was not only evident among teachers with differing characteristics, such as career phases, within the same CPD activity but also within the same teacher across different CPD activities.

Collaborative vs. Independent Activities: One noteworthy finding was the considerably higher levels of engagement reported by teachers in collaborative activities, including peer observation, mentoring, coaching, and informal teaching dialogues, compared to independent activities such as reading professional journals and literature. This contrasts with an earlier study in the Netherlands (Kwakman, 2003) where classroom observation feedback was infrequent, and teachers primarily engaged in professional reading or studying subject literature. This difference could be attributed to China's emphasis on collective efforts in professional growth, where teachers perceive collaboration with colleagues as a means to enhance teaching effectiveness (Ryan *et al*., 2009). This collaborative approach aligns with the educational practices in many other Asian countries and differs from some Western jurisdictions where classroom observation and feedback are less common (OECD, 2014).

Highly Specified vs. Highly Adaptive Activities: The study also unveiled that teachers' engagement in CPD activities was strongly influenced by their individual needs for competence, relatedness, and autonomy, and these needs varied across different career phases. Novice teachers exhibited higher engagement in "highly specified" CPD activities, such as training courses and peer observation with feedback, as they sought immediate support to address job demands and associated challenges. In contrast, mid-career teachers with more experience tended to shift their focus from "highly specified" to "highly adaptive" activities (Koellner & Jacobs, 2015). They reported greater engagement in activities crucial for achieving broader work goals, which involved developing "transformative" skills for complex situations

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rather than just addressing immediate problems. These mid-career teachers also emphasized the significance of exemplary leaders and trainers. To foster engagement during this career phase, it becomes imperative to provide comprehensive support in both cognitive and affective domains.

These findings underscore the dynamic nature of teachers' engagement in CPD activities and emphasize the importance of tailoring CPD offerings to match teachers' career phases and individual needs.

5.2. Factors of teachers' engagement in CPD

The second key finding revolves around factors influencing teachers' engagement in CPD, encompassing instrumental factors, intellectual factors, self-actualizing factors, and CPD cultural factors.

Tangible Incentives vs. Diversified Rewards: Instrumental factors were observed to have less motivating power for teachers' engagement in CPD, particularly among older teachers with lower professional status. This aligns with previous research in Chinese school settings (Karachiwalla & Park, 2017), suggesting that the existing school promotion system may not provide strong incentives for teachers at various skill levels. In China, teacher professional titles, primarily based on qualification levels and teaching experience, govern teacher evaluation and promotion (Ministry of Education [MOE], 2001). Highly educated and experienced teachers are likely to rank higher and receive more substantial salary increases. In addition to the rigid promotion incentives, there may be a need for diversified rewards to engage teachers in later career phases, recognizing their contributions to knowledge sharing and community involvement.

Teaching Competence vs. Professional Autonomy: Intellectual factors played a crucial role in predicting teachers' engagement, but the focus of their efforts varied. Younger teachers prioritized competence and relatedness needs, while mid-career teachers increasingly sought to enhance their professional autonomy through "teacher agency." They actively participated in changing their teaching practices and expressing their opinions within the CPD community. Mid-career teachers, particularly those with 11-15 years of experience, placed significant importance on influential group leaders, emphasizing the motivational aspects related to their values and beliefs, which facilitated their development of professional autonomy.

Student Feedback vs. Public Recognition: Teachers strongly driven by self-actualizing factors demonstrated higher emotional and social engagement. However, there were variations in teachers' focus across career phases. Novice teachers were more motivated by student feedback and outcomes, while teachers at later career stages were influenced by public recognition and peer feedback. This aligns with a study in Italian schools (Guglielmi *et al*., 2016), where younger teachers were more engaged in personal development and colleague support, while older teachers valued being recognized as points of reference for colleagues. This age-related shift in motivation beliefs is influenced by the psychosocial context of the work environment.

Inquiry-based Collaboration vs. Contrived Collaboration: CPD cultural factors were found to have a substantial impact on teachers' engagement. Unlike a previous study (Kwakman, 2003) that emphasized personal characteristics, this study highlights the significance of CPD culture. In China's hierarchical educational system, school cultural factors play a crucial role in shaping CPD (Tan, 2017). This top-down structure can facilitate alignment between policy and implementation but may lead to contrived collaboration rather than inquiry-based collaboration. The study identifies cultural barriers, such

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as training-style TRG routines, that hinder professional autonomy and an inquiry-based professional climate, which may also be present in other Asian countries. For instance, in Singapore, a strong respect for authority poses challenges for CPD implementation (Hairon & Dimmock, 2012).

5.3. Limitations and future studies

Two limitations are noted in this study, offering avenues for future research. First, this study relied on self-reports from teachers as the primary data source. While teachers are a crucial source for insights into their engagement with CPD, incorporating observational assessments and interactions with students could enhance the comprehensiveness of the findings. Additionally, employing a study design with more frequent data collection intervals would capture the dynamic nature of teachers' engagement more effectively.

Second, concerning the participants, it's essential to acknowledge that the voluntary nature of participation could be a potential sampling limitation. Teachers who volunteered for this research might have a higher motivation to improve their professional learning compared to those who did not participate. This volunteer bias could have influenced the study's outcomes and implications. Given the substantial disparities in CPD resources across China, future studies with larger and more diverse samples could explore potential regional variations in teachers' engagement.

6. Conclusion and Implications

This study underscores the significance of Intellectual, Instrumental, Self-actualizing, and CPD Cultural Factors in initiating and sustaining teachers' engagement in CPD. It highlights the central role of CPD Cultural Factors in facilitating and optimizing the impact of these factors. The study also emphasizes the importance of teachers' professional autonomy, especially in emotional and social engagement, indicating that teachers seek not only instructional development but also attitudinal growth through their professional learning.

Furthermore, this research challenges the conventional view of engagement as a relatively stable variable (Macey & Schneider, 2008), revealing that teachers' engagement can vary not only between individuals but also within the same person across different CPD activities.

Additionally, this study contributes to the theoretical development of teacher engagement by exploring the internal relationship between the four engagement factors based on teachers' individual needs. The distinctions in CPD needs among teacher groups, notably between novice and veteran teachers, suggest that future research should explore how these four engagement domains can be thoughtfully integrated to effectively cater to various groups and individuals.

Data Availability Statement

Data is available upon request.

Declaration of Conflicts Interests

The authors would like to declare that they have no conflict of interest to disclose.

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