



TEACHER PROFESSIONAL DEVELOPMENT EXPERIENCES AND NEEDS IN LATVIA: DEVELOPMENT AND APPLICATION OF THE TPD/EN QUESTIONNAIRE

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Abstract

Teachers participate in professional development (PD) at high rates. Research suggests that PD effectiveness depends less on delivery format and more on the specific features that support changes in teaching practice. Less is known about teachers' experiences of these features and how they align with beliefs about teacher learning. This research developed and preliminarily evaluated the Teacher Professional Development Experiences and Needs (TPD/EN) questionnaire and examined how participating Latvian teachers experienced and evaluated features of PD.

A sequential two-stage exploratory survey design was used. First, a literature-based 29-indicator questionnaire on features associated with effective PD was developed and examined through exploratory factor analysis and reliability analysis using data from 107 Latvian general education teachers. Second, experienced and perceived-importance ratings were analysed to examine alignment between teachers' PD experiences and beliefs about teacher learning, using a subsample of 62 teachers who completed both rating scales.

The analysis revealed a 5-factor structure: Active, Collaborative, and Applied Learning; Embedded and Deliberate Practice; School-Level Learning; Goals and Motivation; and Coherent PD Programme Design. Results indicated a gap between frequently experienced content-oriented features and less common implementation-oriented features, including repeated classroom implementation, data use, and sustained practice. Experienced and perceived-importance ratings were positively related but did not fully align, suggesting that the presence of PD features does not necessarily correspond to their perceived importance. The findings provide preliminary evidence regarding the internal structure and reliability of the TPD/EN questionnaire and offer a teacher-centred perspective on features associated with effective PD.

Keywords: teacher professional development, professional development features, perceived importance, exploratory factor analysis, questionnaire development

Introduction

Participation in teacher professional development (PD) is high across education systems. OECD TALIS data show that 87–100% of teachers across education systems, including Latvia, have participated in PD activities in the past 12 months. These participation rates are generally higher than those in comparable professions (OECD, 2025).

Despite high teacher participation in professional development, research has shown these investments do not automatically improve teaching and learning. PD effectiveness depends largely on its design. Syntheses and meta-analyses have indicated that many common PD activities, such as lectures and workshops, have limited effects, while lesson study, instructional coaching, and teacher learning communities have been more reliably linked to improvements in teaching and student outcomes (Kraft et al., 2018; Sims et al., 2021). These more effective

forms share features of practice-based learning, including modelling, practice, feedback, and sustained engagement. The presence of these features in teachers' learning experiences seems more important than the PD format itself. This is also evident in practice-based PD approaches, such as instructional coaching, where effectiveness hinges on how these features are enacted in coach-teacher interactions (Baldinger & Louie, 2025; Blazar et al., 2024).

The Latvian context reflects these broader tensions between high participation, policy expectations, and the forms of PD teachers commonly experience. In Latvia PD is mandatory: teachers must complete at least 36 hours every 3 years, monitored by the State Education Quality Service (Cabinet of Ministers, 2018). Since the 2016–2023 education reform, schools have been increasingly seen as learning organisations, with all members expected to engage in ongoing learning. This has fostered collaborative, school-based learning, such as peer lesson observation, study groups, and collegial activities (Oxford Research Baltics, 2022). However, lectures and formal courses remain the most common forms of PD in Latvia (Brandisauskiene et al., 2020; Oxford Research Baltics, 2022).

At the same time, teachers worldwide often report that PD has a positive impact on their practice. OECD TALIS data show that 55% of teachers in OECD countries and 79% in Latvia felt that PD in the past 12 months had improved their teaching. Teachers who report a positive impact of PD also more often report achieving their lesson aims, a pattern observed across most education systems and levels (OECD, 2025). However, these findings reveal little about which PD features contribute to teachers' perceived impact.

The problem addressed in this research is that, although teachers widely participate in professional development (PD), it remains unclear which specific features they actually experience and to what extent these experiences align with the importance they assign to those features. Although research identifies features associated with effective PD (Boylan et al., 2018; Cordingley et al., 2015; Darling-Hammond et al., 2017; Kraft et al., 2018; Lynch et al., 2019; Sims et al., 2021), these features are typically considered from a design standpoint rather than from the perspective of how teachers experience them and rate their perceived importance.

Taken together, these considerations highlight the need to move beyond categorising PD by its form and instead examine how teachers experience and evaluate features associated with effective PD. This research addresses this gap through a two-stage design. First, it develops and preliminarily evaluates the Teacher Professional Development Experiences and Needs (TPD/EN) questionnaire, a culturally relevant instrument for examining teachers' experiences and perceived importance of PD features in Latvia. Second, it applies the resulting factor structure to examine the forms of PD teachers report as having had a substantial impact on their classroom practice, the PD features they experience, and patterns of alignment and misalignment between experienced and perceived-importance ratings.

Theoretical Background

Teacher PD is a continuous, intentional process where teachers build the knowledge, skills, beliefs, and practices needed to improve teaching quality and student learning (Avalos, 2011; Darling-Hammond et al., 2017). Research commonly defines PD as a process where changes in teachers' knowledge and abilities lead to better teaching practice and improved student outcomes (Desimone, 2009; Yoon et al., 2007). Guskey (2002) has highlighted changes in teachers' beliefs, attitudes, classroom practice, and student outcomes as key indicators of effective PD. However, empirical studies have often focused on teaching practice since it is the clearest, most measurable result of teacher learning (Darling-Hammond et al., 2017; Murray et al., 2025). On this basis, teachers' perceived impact on classroom practice is understood as a self-reported indicator of the classroom-practice level of PD effectiveness (Darling-Hammond et al., 2017; OECD, 2019).

Over recent decades, views on PD have shifted. The focus has moved from short-term training to continuous, collaborative, practice-based learning. This approach emphasises reflective practice, lifelong learning, and participation in teacher learning communities (Avalos, 2011; Darling-Hammond et al., 2017; Opfer & Pedder, 2011). Schools are now seen as learning organisations that foster collective learning, knowledge sharing, and ongoing professional growth among teachers (Kools & Stoll, 2016). This research focuses on systematic, structured teacher PD and on the features through which it is expected to support changes in teaching practice.

Although theories of teacher learning have existed for decades, effective PD is still difficult to implement. Many PD activities have been found to have limited effects on teachers' practice and student outcomes, especially when PD is short, fragmented, or disconnected from classroom needs (Basma & Savage, 2023; Morina et al., 2025; Opfer & Pedder, 2011). Research has shown that one-off training models are less effective, whereas sustained, collaborative, practice-based PD is more strongly associated with improvements in teaching practice and student outcomes (Avalos, 2011; Darling-Hammond et al., 2017; Desimone, 2009). Context and organisation also shape PD effectiveness, including time constraints, school culture, available support, and the coherence and duration of activities (Kools & Stoll, 2016; OECD, 2019).

Contemporary research increasingly suggests that the effectiveness of PD depends less on its formal delivery format and more on the learning mechanisms and design features that support meaningful teacher learning and changes in teaching practice. In this context, teacher PD can be examined through four interrelated components: features, mechanisms, forms, and programmes. PD features refer to specific characteristics associated with effective teacher learning, such as goal setting, modelling, practice, and feedback (Darling-Hammond et al., 2017). These features combine into broader organisational formats of PD, referred to as PD forms, including workshops, collaborative learning groups, classroom observation, and peer learning (Greitāns & Namsone, 2023). PD programmes represent structured sets of activities and materials organised around specific goals, content, and time frames, typically integrating multiple PD forms (Greitāns & Namsone, 2023; Sims et al., 2021). Learning mechanisms are conceptualised as theoretical processes through which PD features are expected to support changes in teachers' learning, motivation, behaviour, and teaching practice (Sims et al., 2021). For example, repeated classroom implementation may be considered a PD feature, whereas deliberate practice represents the underlying learning mechanism through which repeated implementation is expected to support changes in teaching practice. The present research focuses primarily on PD features by examining their latent structure and comparing it with the proposed components of the theoretical model.

Research Aim and Questions

Based on the considerations outlined above, this research had two aims: (1) to develop and preliminarily evaluate the Teacher Professional Development Experiences and Needs (TPD/EN) questionnaire and (2) to apply the resulting factor structure to examine PD forms perceived as having had a substantial impact, experienced PD features, and patterns of alignment and misalignment between experienced and perceived-importance ratings.

Accordingly, the following research questions were formulated. The first two research questions relate to the instrument development and preliminary psychometric evaluation stage:

RQ1. To what extent does the empirical factor structure of the TPD/EN questionnaire correspond to the six theoretically proposed PD mechanisms derived from the IGTP framework and related literature?

RQ2. To what extent do the resulting questionnaire scales demonstrate acceptable internal consistency reliability?

The remaining research questions relate to the application of the questionnaire to examine participating teachers' PD experiences:

RQ3. What forms of PD do participating Latvian teachers report attending, and which are perceived to have had a substantial impact on their classroom practice?

RQ4. Which PD features are most and least frequently experienced in PD activities perceived by teachers as having had a substantial impact on their classroom practice?

RQ5. Are there distinct patterns of alignment and misalignment between experienced and perceived-importance ratings of PD features among participating teachers?

Research Methodology

This research was organised as a sequential two-stage exploratory survey design in which instrument development and empirical application were directly connected. Accordingly, the methodology is presented in two connected stages. Stage 1 involved the development and preliminary psychometric evaluation of a literature-based questionnaire on features associated with effective PD. Stage 2 applied the resulting 5-factor structure to examine participating teachers' PD experiences, perceived impact, and patterns of alignment between experienced and perceived-importance ratings.

Stage 1 employed an *instrument development design* to create a literature-based questionnaire measuring features associated with effective PD. The process involved synthesising findings from major PD frameworks and research reviews, operationalising 29 theoretically derived features, conducting internal content review and pilot testing, and examining the questionnaire's empirical structure through exploratory factor analysis (EFA). The purpose of this stage was not to validate a standardised psychometric scale, but to develop and preliminarily evaluate an exploratory, theory-informed instrument capable of capturing a broad range of PD features.

Stage 2 employed a *cross-sectional survey design* using the newly developed TPD/EN questionnaire. The full sample of 107 Latvian general education teachers was used for the overview of PD participation and the preliminary psychometric evaluation, while the subsample of 62 teachers who completed both experienced and perceived-importance ratings was used for analyses of alignment and misalignment patterns.

Stage 1. Instrument Development

Construct Definition and Feature Selection

As the first step in instrument development, the construct measured by the questionnaire was defined and the PD features to be operationalised as questionnaire items were selected.

Numerous research syntheses and meta-analyses have identified PD features associated with improvements in teaching practice and student outcomes (Boylan et al., 2018; Cordingley et al., 2015; Darling-Hammond et al., 2017; Dunst et al., 2015; Kraft et al., 2018; Lynch et al., 2019; Sims et al., 2021). Although these frameworks differ in emphasis and methodology, many of the identified features recur across studies and can be interpreted as manifestations of similar underlying learning processes.

Recent work by Sims et al. (2021) has proposed a mechanism-based perspective on teacher PD, conceptualising PD as operating through empirically grounded, domain-general mechanisms that explain how teachers acquire, apply, and sustain changes in practice. The authors have grouped these mechanisms into four core purposes of PD: generating new insights (I), supporting goal-directed behaviours (G), developing teaching techniques (T), and embedding changes in classroom practice over time (P), collectively referred to as the IGTP model.

The present research used the IGTP model as the primary conceptual foundation for instrument development. To extend this foundation, major PD reviews and frameworks were synthesised to identify recurring mechanisms associated with effective PD that were not fully captured by the four IGTP mechanisms. Two mechanisms were selected because they appeared consistently across the reviewed literature and addressed areas not fully represented in the IGTP model: the temporal organisation of PD and the organisational context in which teacher learning is embedded (Cordingley et al., 2015; Darling-Hammond et al., 2017; Desimone, 2009; Dunst et al., 2015; Kraft et al., 2018; Lynch et al., 2019). In the conceptual framework of this research, these mechanisms were represented as developmental sequencing and organisational learning ecology. The four IGTP mechanisms can be understood as explaining what drives teacher learning, whereas developmental sequencing and organisational learning ecology explain when, where, and under what circumstances such learning is most likely to occur.

Drawing on the IGTP framework and related research syntheses, six learning mechanisms and 29 associated PD features were identified. The mechanisms are briefly described below, while the corresponding features used for questionnaire construction are summarised in Table 1.

Table 1
Learning Mechanisms and Associated PD Features Used for Questionnaire Development

Learning mechanism	PD features
Insight generation	Prior knowledge activation; Relevant content; Illustrative examples; Subject-specific focus
Developmental sequencing	Revisiting prior topics; Coherent structure; Distributed duration
Goal-directed processes	Goal setting; Credible sources; Performance-based reinforcement; Learning rationale; Belief in improved student outcomes
Technique development	Synoptic tasks; Actionable steps; Peer support; Observable models; Monitoring and feedback; Rehearsal opportunities
Practice embedding	Reflection; Guidance on when to implement; Detailed planning; Self-monitoring and data use; Repeated classroom implementation; Formative assessment data use
Organisational learning ecology	Adaptation to individual needs; Collaborative learning; School-based setting; Whole-school participation; External expertise

Insight generation refers to teacher learning processes that help them develop new understandings of teaching, learning, and classroom practice, thereby creating a cognitive foundation for changes in teaching practice. Features associated with this mechanism support teachers in connecting new learning to existing knowledge, understanding teaching principles, and recognising their relevance for classroom practice (Cirkony et al., 2024; Cordingley et al., 2015; Darling-Hammond et al., 2017; Desimone, 2009; Dunst et al., 2015; Kraft & Blazar, 2017; Lynch et al., 2019; OECD, 2019; Sims et al., 2021; Ventista & Brown, 2023).

Developmental sequencing refers to the structured organisation of PD over time that supports the gradual development, reinforcement, and consolidation of knowledge and teaching practice. This mechanism emphasises coherent sequencing, sustained engagement, and opportunities for repeated application and reflection (Darling-Hammond et al., 2017; Desimone, 2009; Dunst et al., 2015; Kraft et al., 2018; Sims et al., 2021).

Goal-directed processes are mechanisms that support teachers in intentionally translating what they learn through PD into practice through goal setting, motivation, self-regulation, and a

commitment to improvement in teaching practice. These processes help sustain engagement and increase the likelihood that new practices will be implemented in classroom settings (Darling-Hammond et al., 2022; Hattie, 2023; Murray et al., 2025; Robinson, 2023; Sims et al., 2021; Timperley et al., 2020; Ventista & Brown, 2023).

Technique development refers to teacher learning processes through which they acquire, practise, refine, and confidently apply teaching strategies and classroom practices. This mechanism emphasises modelling, guided practice, feedback, rehearsal, and collaborative support for the development of teaching competence (Darling-Hammond et al., 2017; Sims et al., 2021).

Practice embedding refers to the processes through which newly acquired teaching approaches become integrated into routine classroom practice. This mechanism focuses on transfer, reinforcement, reflection, monitoring, and sustained implementation over time (Bandura, 1991; Cirkony et al., 2024; Cordingley et al., 2015; Darling-Hammond et al., 2017; Dunst et al., 2015; Grossman et al., 2009; Schildkamp, 2019; Schön, 1983; Sims et al., 2021).

Organisational learning ecology refers to the broader school environment and professional context that shape and sustain teacher learning. It emphasises the role of collaborative cultures, contextual relevance, school-based learning, collective participation, and access to expertise in supporting professional growth (Balta et al., 2023; Cirkony et al., 2024; Cordingley et al., 2015; Darling-Hammond et al., 2017; de Jong et al., 2021; Hargreaves & Fullan, 2012; Lynch et al., 2019; OECD, 2019; Sims et al., 2021; Stoll et al., 2006; Timperley et al., 2020; Ventista & Brown, 2023; Wenger, 1998).

Together, these six mechanisms capture cognitive, motivational, behavioural, developmental, and organisational processes through which PD contributes to changes in teaching practice. Their associated features were translated into questionnaire items to examine teachers' experiences of PD features and their perceived importance for teacher learning and implementation. The six identified mechanisms and their associated 29 features served as the conceptual basis for questionnaire construction.

Item Generation and Operationalisation

Existing instruments and operationalisations reported in the literature were reviewed during instrument development (Richter & Richter, 2024; Soine & Lumpe, 2014). However, no single instrument was identified that comprehensively captured the range of PD features represented across the selected frameworks while also assessing both teachers' experiences of these features and their ratings of their perceived importance. Consequently, a new instrument was developed for use in the Latvian context.

The questionnaire was developed in Latvian deductively from the conceptual framework presented above. Following the identification of six learning mechanisms and 29 associated PD features, each feature was operationalised as a questionnaire item intended to capture teachers' experiences of PD features and their perceived importance for teacher learning and implementation.

Item wording was designed to reflect the substantive meaning of each feature while remaining concise, comprehensible, and applicable across different forms of PD (see item wording in Table 2). Where conceptually similar features were identified across multiple frameworks, overlapping formulations were consolidated into a single feature to minimise redundancy. Features were retained when they demonstrated clear theoretical grounding, relevance across different PD contexts, and potential observability from the perspective of participating teachers.

The final instrument consisted of 29 items corresponding to the literature-derived PD features described in the conceptual framework. Each feature was operationalised in two parallel

versions. The Experience (R) version assessed the extent to which each feature was present in a PD activity that respondents perceived as having had a substantial impact on their classroom practice during the previous 12 months. The Perceived-Importance (I) version assessed the extent to which respondents believed the same feature would support teacher learning and the implementation of new teaching practices. This parallel structure enabled direct comparison between teachers' experiences of PD features and their perceived importance.

Content Review and Pilot Testing

Prior to data collection, the questionnaire underwent an iterative content review process and pilot testing to evaluate item clarity, comprehensibility, technical functionality, and overall suitability for the target population. Given the exploratory nature of the instrument and its development for the present research, the review process focused primarily on improving item wording and ensuring the questionnaire's practical usability.

The initial questionnaire draft was reviewed internally by two co-authors with complementary expertise. One co-author reviewed the linguistic clarity and wording of questionnaire items, while another reviewed the items from the perspective of survey design and data collection procedures. The review was conducted through several iterative rounds during instrument development. Suggestions primarily concerned the wording and formulation of items, resulting in minor refinements intended to improve clarity and readability before pilot administration.

Following content review, the questionnaire was pilot-tested with four general education teachers. All pilot participants were women aged 26–60 years from two Latvian statistical regions (Riga and Latgale). The pilot survey was administered remotely using the same online format and procedures later employed in the main data collection. Completion time was approximately 10–20 minutes. Pilot participants were informed that they were acting as pilot testers and were asked to evaluate several aspects of the questionnaire, including technical functionality, clarity of item wording, comprehensibility of instructions, and adequacy of response options. Feedback could be provided either in writing or through a telephone discussion with the researcher. Only one participant provided specific comments. The feedback concerned four issues: (a) a perception that respondents might be required to log in with an email address despite the survey being anonymous, (b) the wording of one demographic question, (c) the optional status of one questionnaire item, and (d) the wording of a question asking respondents to identify a PD activity that they perceived as having had a substantial impact on their classroom practice during the previous 12 months. Subsequent examination confirmed that anonymous completion without login was possible. One technical issue was corrected by making an intended item mandatory. Other suggestions were discussed among the research team and retained in their original form because they were considered to better reflect the intended meaning of the constructs being assessed. Overall, the pilot testing indicated that the questionnaire was technically functional, understandable to respondents, and feasible to complete within a reasonable timeframe. No substantial revisions to item content were considered necessary following the pilot phase.

Preliminary Psychometric Evaluation

An exploratory factor analysis (EFA) using principal axis factoring and Varimax rotation with Kaiser normalisation was conducted on the perceived-importance (I) ratings from the full survey sample ($N = 107$), described in the Survey Sample subsection. In reporting the EFA and subsequent analyses, the term factors is used to refer to the EFA-derived structure, whereas the term scales is used only when referring to questionnaire scores and reliability estimates calculated from the items assigned to each factor. Although correlations among the underlying

constructs were conceptually plausible, both orthogonal and oblique rotation solutions were examined during the exploratory analysis. The oblique solution produced a highly similar pattern of salient loadings, comparable item allocation, and the same substantive interpretation of the factor structure. The factor correlation matrix indicated only modest inter-factor correlations, and the orthogonal solution provided a simpler and more interpretable structure for this initial exploratory stage of instrument development. Therefore, the Varimax solution was retained for presentation. This choice was made to facilitate interpretation and should not be taken to imply that the underlying constructs are theoretically independent. The Kaiser-Meyer-Olkin measure indicated very good sampling adequacy ($KMO = .845$), and Bartlett's test of sphericity was significant, $\chi^2(406) = 1444.44, p < .001$, supporting the suitability of the data for factor analysis. Although the sample size was modest in relation to the 29 questionnaire indicators, the EFA was retained because the purpose of the analysis was exploratory and the data showed acceptable suitability for factor analysis.

5-, 6-, and 7-factor solutions were examined. A 5-factor solution was retained because it provided the most parsimonious and interpretable structure, whereas alternative solutions resulted in weak, unstable, or conceptually fragmented factors. Items were assigned to factors based on their highest loadings ($\geq .40$), with conceptual considerations guiding assignment in cases of cross-loadings. One feature (Item 10) failed to load to .40 on any factor and was excluded from the final solution. Factor loadings for retained indicators ranged from .44 to .80 (Table 2).

Five factors with eigenvalues greater than one were retained, jointly explaining 55.34% of the total variance and providing an interpretable 5-factor solution appropriate for this preliminary exploratory investigation. Prior to rotation, the first component accounted for 34.25% of the variance, indicating a strong general factor. Following rotation, variance was more evenly distributed across the five components, which explained 15.99%, 11.91%, 11.75%, 8.21%, and 7.48% of the variance, respectively. The resulting solution demonstrated a balanced, 5-factor structure and provided preliminary evidence regarding the instrument's internal structure.

The resulting factors were interpreted as: (1) Active, Collaborative, and Applied Learning; (2) Embedded and Deliberate Practice; (3) School-Level Learning; (4) Goals and Motivation; and (5) Coherent PD Programme Design. Below are short descriptions of each resulting factor.

F1. Active, Collaborative, and Applied Learning: PD that engages teachers in active participation, collaboration, reflection, and the practical application of new knowledge and skills through authentic learning activities.

F2. Embedded and Deliberate Practice: PD that supports sustained improvement through repeated practice, self-monitoring, feedback, data-informed decision-making, and planned classroom implementation over time.

F3. School-Level Learning: PD situated within the school context that promotes collective participation, peer support, and the integration of new learning with teachers' existing knowledge and experiences.

F4. Goals and Motivation: PD that strengthens purposeful engagement and implementation by supporting goal setting, providing a clear rationale for change, and enhancing motivation through credible evidence and expected student benefits.

F5. Coherent PD Programme Design: PD that is systematically organised, relevant to teachers' professional needs, and aligned with prior learning to create a coherent and meaningful learning experience.

The empirical 5-factor solution differed from the proposed six-mechanism theoretical model. Most notably, features theoretically associated with Insight Generation, Technique Development, and parts of Organisational Learning Ecology converged into a single factor, Active, Collaborative, and Applied Learning, suggesting that participating teachers perceived

these features as components of a unified learning experience rather than distinct learning mechanisms.

Goal-Directed Processes was largely retained as Goals and Motivation, comprising goal setting, learning rationale, belief in improved student outcomes, and implementation planning. Notably, implementation planning, originally conceptualised within Practice Embedding, loaded more strongly on this factor, indicating that participating teachers may have viewed planning primarily as a motivational and goal-oriented process.

Practice Embedding was only partially preserved. Self-monitoring, formative assessment data use, repeated implementation, and distributed duration formed Embedded and Deliberate Practice, whereas reflection, feedback, guidance, and rehearsal merged with Active, Collaborative, and Applied Learning. This pattern suggested that participating teachers distinguished between active learning experiences and the longer-term processes of implementation and monitoring.

Developmental Sequencing and Organisational Learning Ecology did not emerge as separate factors. Instead, the features associated with these theoretical mechanisms loaded on other EFA-derived factors: distributed duration on Embedded and Deliberate Practice, revisiting prior topics on School-Level Learning, and collaborative learning and adaptation to individual needs on Active, Collaborative, and Applied Learning. These findings suggested that, in participating teachers' ratings, temporal and organisational features were embedded within broader EFA-derived factors rather than forming separate factors of their own.

One theoretically proposed feature, performance-based reinforcement (item 10), did not load substantially on any factor and was excluded from the final solution.

Table 2
Factor Analysis of the Teacher PD Experiences and Needs (TPD/EN) Questionnaire

Factors	F1	F2	F3	F4	F5
Factor 1. Active, Collaborative, and Applied Learning					
(3) The activity included multiple practical examples that effectively illustrated the underlying concepts or principles.	.66				
(7) The activity included content directly relevant to the subject(s) I teach.	.65				
(20) The activity provided opportunities for collaborative learning.	.62				
(21) The activity provided clear guidance regarding the situations and contexts in which the new teaching practice should be applied.	.59				
(16) The activity enabled me to observe the new teaching practice being implemented in authentic contexts (e.g., through peer classroom observation, demonstration lessons, or video examples).	.59		.44		
(9) The content was based on trustworthy research evidence and credible professional knowledge sources.	.58			.44	
(14) The activity provided clear, actionable guidance on how to implement the new teaching practice.	.58				
(18) The activity provided opportunities to rehearse and practise the new teaching practice one or more times.	.57	.47			
(19) The activity included individual or collaborative reflection on my learning and implementation experiences.	.56		.42		
(12) The activity was responsive to my individual learning needs.	.53				
(17) The activity provided feedback on my implementation of newly acquired knowledge and skills.	.48		.47		
(15) The activity provided opportunities to obtain peer support when implementing the new teaching practice.	.44		.42		

Factor 2. Embedded and Deliberate Practice		
(25) The activity encouraged me to collect formative assessment evidence to evaluate the impact of the new teaching practice on student learning.	.70	
(23) The activity required me to monitor and evaluate my implementation of the new teaching practice by collecting and analysing relevant evidence to inform subsequent actions.	.70	
(29) The activity consisted of multiple PD sessions distributed over several weeks or months.	.67	
(24) The activity required me to implement the new teaching practice with a particular class on multiple occasions.	.60	
(28) The activity was facilitated wholly or partly by external experts rather than solely by colleagues from my school.	.52	
Factor 3. School-Level Learning		
(26) The activity was conducted within my school.	.76	
(27) The activity involved most members of the teaching staff in my school.	.64	
(1) The activity activated my prior knowledge and experience.	.62	
(4) The activity revisited or assessed learning from previous sessions when delivered as part of a series of sessions.	.57	
Factor 4. Goals and Motivation		
(11) The activity clearly explained why the proposed teaching practice was important and worth adopting.	.68	
(22) The activity required me to develop a detailed implementation plan specifying when, where, how often, for how long, and in what ways the new teaching practice would be used.	.49	.58
(13) The activity strengthened my belief that implementing the new teaching practice could improve student learning outcomes.	.57	
(8) The activity required me to establish a goal for implementing changes in my teaching practice.	.54	
Factor 5. Coherent PD Programme Design		
(6) The activity had a clear, coherent, and logical structure	.80	
(2) The activity provided content relevant to my learning needs.	.59	
(5) The learning tasks required me to apply previously acquired knowledge and skills.	.55	

Note. $N = 107$. Factor loadings below 0.40 are suppressed. Retained factor loadings for each factor are in bold.

Cronbach's alpha coefficients ranged from .61 to .90 across the five scales. Internal consistency was excellent for F1 ($\alpha = .90$), acceptable for F2 ($\alpha = .78$), F4 ($\alpha = .73$), and F3 ($\alpha = .72$), and modest for F5 ($\alpha = .61$). These results indicated that most scales demonstrated satisfactory reliability, although the reliability of F5 should be interpreted with caution and warrants further examination in future validation studies. Although the internal consistency of F5 was lower than that of the other scales ($\alpha = .61$), values above .60 are often considered acceptable in exploratory research and early stages of instrument development, particularly for short scales.

Stage 2. Cross-Sectional Survey

After the preliminary factor structure had been established, the resulting factor-level scores were used to examine teachers' PD experiences and patterns of alignment and misalignment

between experienced and perceived-importance ratings. Stage 2 therefore represented an application of the newly developed TPD/EN questionnaire to investigate substantive questions about teacher PD in Latvia corresponding to RQ3–RQ5.

Instrument

The questionnaire consisted of two sections. The first section collected background information about respondents, including gender, age, highest educational qualification, years of teaching experience, subject area taught, school type, and geographical region. In addition, teachers were asked about their PD experiences during the previous 12 months: (a) hours of PD activities, (b) whether they had participated in a PD activity that they perceived as having had a substantial impact on their classroom practice (Yes/No), and (c) which form of PD they perceived as having had the greatest impact on their classroom practice (listed forms: Lecture or seminar/Workshop/Practitioner presentation/sharing of professional experience/Teacher learning group/Collaborative learning group/Teacher learning network/Peer classroom observation and discussion/Observation of your classroom teaching for instructional coaching or support/Other). Thus, perceived impact was measured as teachers' self-reported judgement and was not treated as an objective measure of changes in classroom practice or student outcomes.

The second section comprised the Teacher PD Experiences and Needs (TPD/EN) Questionnaire, which was developed and preliminarily evaluated in Stage 1 of the research. The instrument was designed to assess teachers' experiences of PD features and their perceptions of the importance of those features for PD and improvement in teaching practice. The questionnaire consisted of 29 indicators, each formulated as a statement describing a specific feature of PD. All items were presented in a single list in random order.

Two parallel sets of items were used. The experienced (R) rating version captured teachers' experiences of a PD activity within the previous 12 months that they perceived as having had a substantial impact on their classroom practice. This section was completed only by respondents who reported participating in such an activity. The perceived-importance (I) rating was completed by all respondents. It assessed how helpful each feature would be for learning and implementing new approaches. Items were rated on a 5-point Likert scale. For the experienced (R) rating version, 1 indicated "did not occur" and 5 indicated "to a great extent". For the perceived-importance (I) rating version, 1 indicated "would not help" and 5 indicated "would help a great deal". An additional "do not know / cannot recall" option was present. The questionnaire was administered in Latvian.

Survey Sample

The target population was general education teachers working in Latvia. The sample was a non-probability voluntary response sample; therefore, it should not be interpreted as representative of all Latvian teachers.

The final survey sample consisted of 107 teachers employed in general education schools across Latvia. This number represented all eligible and sufficiently complete responses obtained during the data collection period and included in the analyses. The full sample was used for analyses based on data available from all respondents, while analyses requiring both experienced (R) and perceived-importance (I) ratings were based on a smaller subsample. Participants ranged in age from 20 to 71 years ($M = 48.3$, $SD = 11.2$) and had between 1 and 50 years of teaching experience ($M = 22.8$, $SD = 13.6$). The sample was predominantly female (96%), closely reflecting the gender composition of the Latvian teaching workforce (OECD, 2025).

Responses were obtained from teachers in all five statistical regions of Latvia, including Riga and Vidzeme, Kurzeme, Zemgale, and Latgale, with broadly comparable representation across regions. Participants worked at different educational levels, including primary education (20%), lower secondary education (50%), and upper secondary education (28%). They represented a diverse range of subject specialisations, most commonly mathematics and science (50%), languages (38%), and humanities and arts (38%), while a smaller proportion taught design and technologies (16%). Because respondents could select more than one subject area, percentages exceed 100%.

A smaller analytical subsample of 62 teachers was used for analyses involving both experienced (R) and perceived-importance (I) ratings, including the cluster analysis. This subsample consisted of teachers who reported participating in a PD activity that they perceived as having had a substantial impact on their classroom practice and who completed both rating versions. Respondents in this group ranged in age from 22 to 68 years ($M = 46.3$, $SD = 10.9$) and had between 1 and 50 years of teaching experience ($M = 20.2$, $SD = 13.4$). Respondents in this group represented all statistical regions of Latvia in broadly similar proportions. Respondents in this group worked at different educational levels, including primary education (27%), lower secondary education (44%), and upper secondary education (27%). Respondents in this group represented a diverse range of subject specialisations, most commonly mathematics and science (61%), languages (34%), humanities and arts (50%), and design and technologies (17%). Because respondents could select more than one subject area, percentages exceed 100%.

Data Collection and Research Ethics

Data were collected using an online questionnaire administered via Google Forms. The questionnaire link was shared through professional teacher networks using an open-access survey link. Because recipients could further share the link within their professional networks, the total number of individuals who received the invitation could not be determined. Consequently, a response rate could not be calculated. This sampling and data collection procedure constituted convenience sampling and limited the ability to assess non-response bias or the representativeness of the sample. Therefore, the findings should be interpreted as exploratory rather than representative of the broader population of Latvian teachers.

The research received ethical approval from the Humanities and Social Sciences Research Ethics Committee at [institution removed for blinded review] (Approval No. 6/2025). All procedures were conducted in accordance with the ethical principles for research involving human participants, including respect for autonomy, voluntary participation, confidentiality, and minimisation of potential harm. Prior to accessing the questionnaire, participants were provided with an information sheet outlining the research purpose, the voluntary nature of participation, the use of the data for research purposes, and the contact details of the research team. Informed consent was obtained electronically before participants proceeded to the questionnaire.

No personally identifying information was collected. Responses were anonymous and were analysed only in aggregated form. Data were stored securely and accessed only by the research team. All data management procedures complied with applicable data protection regulations, including the General Data Protection Regulation of the European Union. Given the non-invasive nature of the research and the absence of sensitive personal questions, participation was considered to involve minimal risk. No incentives were offered for participation. Although no technical restrictions were implemented to prevent multiple submissions, repeated responses were considered unlikely due to the targeted distribution strategy. Because participation was self-selected and based on voluntary response, the sample should be regarded as non-probabilistic and potentially subject to self-selection bias. This means that teachers who were more engaged in PD or held stronger views about PD may have been more likely to participate, which may have influenced the distribution of reported PD experiences and perceived-importance ratings.

Data Analysis

For Stage 2 analyses, the empirically derived 5-factor structure from Stage 1 was used as the analytical framework. Item-level experienced (R) and perceived-importance (I) ratings were aggregated into factor-level scores, allowing comparison of teachers' reported PD experiences with their ratings of the perceived importance of the PD features represented in the same factor.

Descriptive statistics were used to summarise respondents' demographic characteristics, reported participation in PD activities, and ratings of PD features. Frequencies and percentages were calculated for categorical variables, including forms of PD attended and forms perceived as having had a substantial impact on teachers' classroom practice. Means, standard deviations, medians, and ranges were calculated for continuous variables, including reported PD hours and item- and factor-level ratings. All analyses were conducted using IBM SPSS Statistics Version 29.0.

To examine patterns of alignment and misalignment between experienced (R) and perceived-importance (I) ratings, a two-step cluster analysis was conducted. Only respondents who completed both rating versions were included in this analysis ($n = 62$). The analysis used factor-level scores for the five EFA-derived factors. This exploratory procedure was used to identify groups of respondents with similar patterns across experienced and perceived-importance ratings. The number of clusters was determined automatically by the SPSS two-step clustering algorithm using model-fit criteria.

Research Results

Overview of Reported PD Activities in the Stage 2 Survey Application

Among Stage 2 respondents who provided a numerical estimate of PD hours over the previous 12 months ($n = 95$), the average number of hours was 42.39 ($SD = 39.18$), with a range of 2 to 240 hours ($Md = 30$). Twelve additional respondents provided non-quantifiable textual responses and were therefore not included in this specific analysis.

Respondents were asked to indicate which forms of PD they had attended in the past 12 months and which of these they perceived as having had a substantial impact on their classroom practice. Multiple participation forms could be selected, whereas only one activity could be identified as having the greatest impact. Overall, 57.9% of respondents ($N = 62$) reported having experienced at least one PD activity in the past 12 months that they perceived as having a substantial impact on their classroom practice. The distribution of participation and perceived impact across different forms is presented in Table 3.

Lectures were by far the most commonly attended form of PD, followed by collaborative formats. In terms of perceived impact, observing one's own lesson with methodological support was most frequently identified as a form perceived as having had a substantial impact, followed by experience-sharing sessions and lectures.

Table 3
Forms of PD: Attendance and Forms Perceived as Having Had a Substantial Impact on Classroom Practice

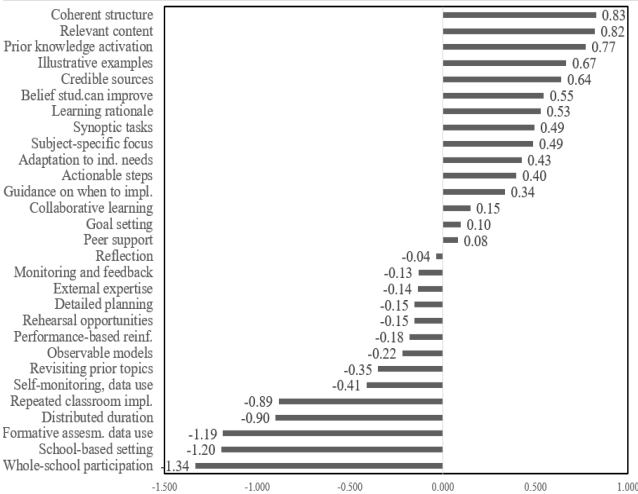
Form of PD	Attendance (%) (N = 107)	Perceived substantial impact (%)
Lecture	83	17
Learning group	57	16
Collaborative group	54	12
Workshop	47	14
Experience sharing session	45	17
Observation and analysis of a colleague's lesson for learning purposes	44	11
Observation of one's own lesson with methodological support	40	19
Networking activities	13	7

Note. Percentages in the third column are calculated among respondents who participated in the respective activity. Respondents could indicate participation in more than one form of PD; therefore, percentages in the second column exceed 100%.

Distribution of PD Features in Teachers' Experience

This analysis was based on the subsample of teachers who completed both rating versions ($n = 62$). Figure 1 presents the deviation of individual PD features from the overall mean of experienced PD ratings. Positive values indicate features that are experienced more frequently relative to the average, while negative values indicate features that are experienced less frequently. The overall mean of experienced PD ratings was relatively high (3.89 on a 5-point scale), indicating that even features below the mean were generally experienced to a considerable extent.

Figure 1
Deviation of Experienced PD Feature Means from the Overall Mean ($n = 62$)



Several features related to the content of PD programmes – such as coherent structure, relevant content, prior knowledge activation, illustrative examples and reference to credible sources - were rated above the overall mean, indicating that these elements are commonly present in teachers' experiences.

In contrast to the more frequently present content elements, features related to the application and sustained use of new practices – such as repeated classroom implementation, distributed duration, and the use of assessment data – were consistently rated below the mean. School-level elements, including school-based setting and whole-school participation, also appeared among the less frequently experienced features. Overall, the results showed an uneven distribution of PD features across teachers' reported experiences.

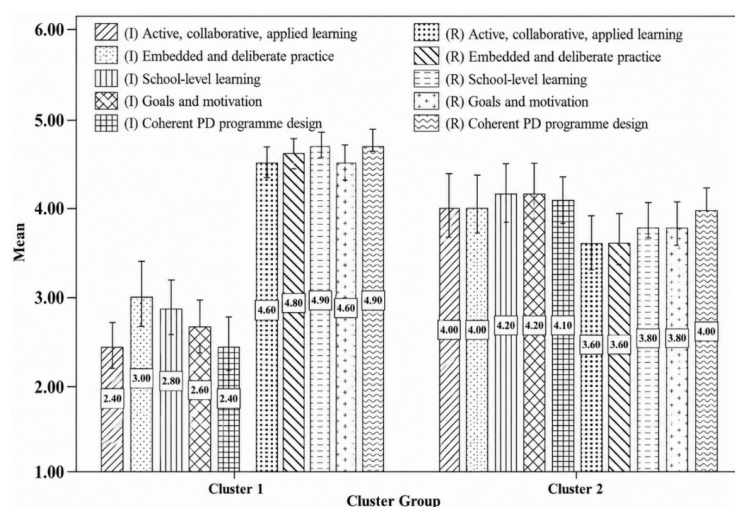
Alignment and Misalignment Between Experienced and Perceived-Importance Ratings

Building on these findings about the uneven distribution of PD features and using the 5-factor structure established in Stage 1, the analysis then examined how teachers' experiences aligned with their perceptions of importance. In this research, a sub-sample of 62 teachers first evaluated their experiences of the PD activities they had actually participated in (R), and only subsequently assessed what they perceived as important (I). Mean factor-level ratings of experienced PD (R) exceeded those of perceived importance (I). To further explore patterns of alignment and misalignment between experienced (R) and perceived-importance (I) PD features, a cluster analysis was conducted using factor-level scores.

Given the relatively small subsample used for this analysis ($n = 62$), the two-cluster solution should be regarded as highly preliminary and exploratory rather than as a stable classification of teachers. The analysis yielded two clusters of respondents. Cluster 1 (CL1) included 28 teachers and was characterised by more variable relationships between experienced and perceived-importance ratings across features. Experienced ratings generally exceeded perceived importance. Cluster 2 (CL2) included 34 teachers and showed a stronger correspondence between experienced and perceived-importance ratings, with no systematic differences between them. No significant differences between clusters were found in age, years of experience, or education level. Figure 2 illustrates the differences between experienced (R) and perceived-importance (I) factor scores across the two identified clusters.

Figure 2

Mean Experienced (R) and Perceived-Importance (I) Factor Scores Across the Two Clusters



Note. Error bars represent 95% confidence intervals.

Significant correlations between experienced (R) and perceived-importance (I) ratings were observed in both clusters, with stronger associations in CL1. This pattern was observed despite the previously reported higher overall experienced (R) ratings relative to perceived-importance (I) ratings.

Discussion

This research developed and preliminarily evaluated the Teacher Professional Development Experiences and Needs (TPD/EN) questionnaire and applied it to examine participating teachers' PD experiences, perceived-importance ratings, and alignment between the two. The factor analysis conducted in Stage 1 provided initial evidence of a 5-factor structure that only partly corresponded to the six theoretically proposed mechanisms. In participating teachers' ratings, several theoretically distinct PD features clustered within the same EFA-derived factors rather than forming separate factors corresponding to the theoretical mechanisms. In Stage 2, implementation-oriented features, including repeated classroom implementation, distributed duration, formative assessment data use, and self-monitoring, were less frequently experienced than more content-oriented features. The cluster analysis identified tentative patterns of alignment and misalignment between experienced and perceived-importance ratings.

The Structure of Effective PD from Teachers' Perspectives

The 5-factor solution only partly corresponded to the six theoretically proposed mechanisms, suggesting that participating teachers grouped some PD features differently from the theoretical structure used for questionnaire development.

The clearest example was the factor Active, Collaborative, and Applied Learning, which combined features related to insight generation, technique development, and parts of organisational learning ecology. Subject-specific content, modelling, actionable guidance, feedback, reflection, and collaboration clustered together rather than forming separate factors. This pattern is consistent with situated and social perspectives on learning, which emphasise that teacher learning develops through practice, collaboration, feedback, and reflection in real contexts (Lave & Wenger, 1991; Opfer & Pedder, 2011; Wenger, 1998). In this factor, modelling, collegial discussion, feedback, reflection, and trying new approaches were not separated in participating teachers' ratings. They appeared as parts of the same practical PD experience, where understanding a new idea, seeing it enacted, discussing it with others, and considering its classroom use are closely connected.

A contrasting pattern appeared in Embedded and Deliberate Practice. This factor included repeated classroom implementation, self-monitoring, data use, and sustained practice over time. Its separation from Active, Collaborative, and Applied Learning suggests that teachers distinguished between participating in active PD activities and applying, monitoring, and refining new practices in the classroom. This finding supports the view that implementation is not simply an extension of PD participation, but a distinct part of the process through which PD is expected to support teacher learning and changes in teaching practice.

Developmental Sequencing and Organisational Learning Ecology did not emerge as separate factors; their features were distributed across other factors. Thus, while mechanism-based frameworks such as IGTP help explain the processes through which PD may support changes in teaching practice, participating teachers' ratings showed how these mechanisms were experienced and organised in practice.

Teachers' Experiences of PD Forms and Features

Participating teachers reported an average of more than 42 hours of PD during the previous 12 months, exceeding the nationally mandated requirement. This is broadly consistent with OECD evidence indicating that participation in teacher PD is widespread across education systems (OECD, 2025). However, high reported participation does not necessarily mean that teachers experience the types of PD most strongly associated with changes in teaching practice. For this reason, examining the forms and features of PD that teachers encounter is more informative than participation levels alone.

The results showed a discrepancy between the forms of PD most commonly attended and those perceived as having substantial impact. Lectures remained by far the most frequently attended form of PD, despite evidence that sustained, practice-based approaches generally produce stronger effects on teacher practice and student outcomes than transmissive training formats (Darling-Hammond et al., 2017; Kraft et al., 2018; Sims et al., 2021). At the same time, observation of one's own teaching accompanied by methodological support was most frequently identified as having had a substantial impact on classroom practice. Such activities include several features associated with effective PD, including observation, feedback, reflection, and support for implementation. This contrast suggests that the PD forms teachers most often attend are not necessarily the same as those they perceive as having had the greatest impact on their classroom practice.

The analysis of individual PD features revealed a clear imbalance between content-oriented and implementation-oriented features. Features related to the content and organisation of PD, including relevant content, coherent structure, illustrative examples, activation of prior knowledge, and the use of credible sources, were among the most frequently experienced. These features are also commonly emphasised in research on effective PD, where clear content, coherence, examples, and links to teachers' prior knowledge are seen as important conditions for teacher learning (Darling-Hammond et al., 2017; Desimone, 2009; Sims et al., 2021).

By contrast, features supporting the enactment, monitoring, and refinement of practice were less common. Repeated classroom implementation, formative assessment data use, self-monitoring, and distributed duration all appeared among the least frequently experienced features. This matters because improvements in classroom practice depend not only on acquiring new knowledge, but also on opportunities to practise, receive feedback, evaluate implementation, and refine teaching approaches over time (Darling-Hammond et al., 2017; Grossman et al., 2009; Sims et al., 2021). From the perspective of deliberate practice, repeated classroom implementation alone is unlikely to be sufficient. Improvement is more likely when practice is directed towards a specific goal and supported by feedback, monitoring, and opportunities to adjust and refine performance (Ericsson et al., 1993).

School-level PD features were also less frequently experienced. Features such as school-based setting and whole-school participation were among the least frequently experienced, despite policy emphasis on schools as learning organisations and the promotion of collaborative teacher learning in Latvia and internationally (Kools & Stoll, 2016; OECD, 2025).

An important finding for interpreting the experienced-features results is that 58% of participating teachers reported taking part in a PD activity that they perceived as having had a substantial impact on their classroom practice, despite the relatively limited presence of implementation-oriented features. Teachers' judgements of substantial impact may therefore refer to teacher-level changes, such as new knowledge, changed beliefs, increased motivation, or intentions to modify practice, rather than necessarily indicating sustained changes in classroom implementation. This interpretation is consistent with Desimone's (2009) distinction between teacher knowledge and beliefs, teaching practice, and student outcomes in studies of PD effects. Evidence from the Latvian context also suggests that teachers' self-reports of teaching practices

may differ considerably from externally observed classroom behaviour (Greitāns & Namsone, 2023). Consequently, perceived impact should not automatically be interpreted as evidence of sustained changes in teaching practice, particularly when opportunities for repeated practice, monitoring, and feedback are limited.

Alignment and Misalignment Between Experience and Perceived Importance

The cluster analysis offered exploratory insight into how teachers' reported PD experiences relate to their perceived importance of PD features. The main finding is that experienced (R) and perceived-importance (I) ratings were positively related, but did not fully align. In particular, experienced (R) ratings tended to exceed perceived-importance (I) ratings in one of the identified clusters. This suggests that the reported presence of PD features does not automatically translate into their perceived importance.

One possible explanation is that teachers rate the importance of PD features through their own beliefs, prior experiences, and interpretations of usefulness. A feature may be present in a PD activity, but teachers may not perceive it as important if its purpose or benefit is not clear. This interpretation is consistent with Clarke and Hollingsworth's (2002) view that professional growth depends on how external experiences interact with teachers' personal domain, including beliefs and attitudes. From this perspective, teachers may assign different levels of importance to the same PD features because they connect these features differently with their own beliefs, needs, and classroom practice. Therefore, PD evaluation should consider not only whether features associated with effective PD are present, but also whether teachers understand why these features matter.

Strengths and Limitations

Several strengths of the present research should be acknowledged. First, the research was grounded in a clearly articulated theoretical framework that integrated the IGTP model (Sims et al., 2021) with broader research on teacher PD. This theory-driven approach provided a transparent rationale for questionnaire development and enabled examination of the correspondence between theoretically proposed mechanisms and teachers' ratings of PD features. Second, the research moved beyond participation-based descriptions of PD by incorporating both experienced and perceived-importance perspectives. This dual approach enabled examination not only of which features teachers encounter in PD, but also of how they rate their importance for teacher learning and improvement in teaching practice. Third, the research included teachers from all statistical regions of Latvia and represented a range of educational levels, subject areas, and levels of professional experience, providing a diverse, although not representative, overview of participating teachers' PD experiences. Finally, the combination of variable-centred and person-centred analytical approaches allowed exploration of both the latent structure of PD features and patterns of alignment between experience and perceived importance, providing a more nuanced understanding of teachers' PD experiences and ratings.

At the same time, several limitations should be considered when interpreting the findings. First, although the KMO value and Bartlett's test supported the suitability of the data for factor analysis, the sample size was modest in relation to the number of questionnaire indicators. The respondent-to-item ratio was below commonly recommended guidelines for EFA; therefore, the 5-factor structure should be interpreted as preliminary and requires replication in larger, independent samples, preferably using confirmatory factor analysis. Second, as an initial-stage instrument, the questionnaire has undergone only a preliminary psychometric evaluation. Although the results provide preliminary evidence regarding internal structure and internal

consistency, further validation, including confirmatory factor analysis, measurement invariance testing, and examination of criterion-related validity, is needed. Third, the voluntary response sampling strategy and data collection through professional networks may have introduced self-selection bias. Teachers who were more engaged in PD or held stronger views about PD may have been more likely to participate, which may have influenced the distribution of reported PD experiences and perceived-importance ratings. Consequently, the findings should be interpreted as exploratory evidence from a non-probabilistic sample rather than as representative of all Latvian teachers. Fourth, as all data were self-reported, recall errors, social desirability bias, and subjective interpretation may have influenced the results. Fifth, the cross-sectional design limits conclusions regarding causal relationships between PD features, perceived importance, perceived impact, and changes in teaching practice.

An additional limitation concerns the cluster analysis. Because this analysis was based on a relatively small subsample of teachers who completed both experienced and perceived-importance ratings ($n = 62$), the two-cluster solution should be regarded as highly preliminary and potentially unstable. The identified clusters should therefore be interpreted as tentative patterns of alignment and misalignment rather than as stable teacher profiles or population-level classifications. Taken together, the modest EFA sample, the small cluster-analysis subsample, the modest reliability of Factor 5, and the absence of CFA mean that the psychometric and cluster-analysis findings should be interpreted as preliminary and not generalisable.

Finally, the research was conducted within the Latvian educational context, which has specific policy requirements, PD structures, and cultural conditions. Although many of the identified PD features are consistent with the international literature, the TPD/EN questionnaire has not yet been validated across national contexts. Therefore, its use in other educational systems would require cultural adaptation, further psychometric evaluation, and cross-national validation.

Conclusions and Implications

This research developed and preliminarily evaluated the Teacher Professional Development Experiences and Needs (TPD/EN) questionnaire, a theory-informed instrument designed to assess both teachers' experiences of PD features and their ratings of the perceived importance of these features. The instrument was then applied to examine participating teachers' PD experiences in Latvia.

The analysis identified a 5-factor structure that partly corresponded to, but did not fully reproduce, the theoretically proposed learning mechanisms. The application of the questionnaire showed that lectures were the most commonly attended form of PD, while observation of one's own teaching with methodological support was most often perceived as having had a substantial impact on classroom practice. The findings also revealed an imbalance between frequently experienced content-oriented features and less frequently experienced implementation-oriented features associated with sustained changes in teaching practice.

Finally, the research showed that experienced and perceived-importance ratings were positively related but did not fully align. This suggests that reported experiences of PD features do not necessarily correspond to the perceived importance teachers assign to those features for teacher learning and improvement in teaching practice.

The findings have implications for how teacher PD is designed, implemented, and evaluated. Participation rates and total hours alone provide limited information about PD quality. Although participating teachers reported high levels of PD participation, their experiences were imbalanced: content-oriented features were more common than features supporting implementation. This suggests that PD policy and evaluation should move beyond attendance and hours and give greater attention to the features of PD activities that support teacher learning and changes in teaching practice.

The findings highlight the need to strengthen opportunities for rehearsal, feedback, support, and repeated practice. PD design should include more opportunities for repeated classroom application, self-monitoring, use of formative assessment data, and distributed learning over time, as these features were among the least frequently experienced in this research.

The findings point to the need to strengthen school-level PD structures. School-based settings and whole-school participation were less frequently experienced than some other PD features. This suggests that collaborative teacher learning should be connected more systematically with school-based improvement processes.

The findings are also relevant for PD approaches such as instructional coaching. Observation of one's own teaching, accompanied by methodological support, was the PD form most often perceived to have had a substantial impact on classroom practice. This suggests that teachers may particularly value PD approaches that engage directly with classroom practice and include feedback, reflection, guided improvement, and support for implementation. Instructional coaching is one possible approach that brings these features together, but its effectiveness would need to be examined through further research in the Latvian context.

The TPD/EN questionnaire may have practical value as a tool for PD planning and evaluation. The instrument captures both teachers' experiences of PD features and their ratings of the perceived importance of these features. It can therefore be used to identify strengths and gaps in existing PD provision. Such information may help schools, PD providers, and policy-makers design programmes that better align features associated with effective PD with teachers' needs and experiences.

Several directions for future research follow from these findings and limitations. First, the 5-factor structure should be examined using confirmatory factor analysis in larger, independent samples. Second, future research should examine the applicability of the TPD/EN questionnaire beyond the Latvian context through cultural adaptation, further psychometric evaluation, cross-national validation, and tests of measurement invariance across teacher groups and national settings. Third, longitudinal studies are needed to examine how teachers' PD experiences and perceived-importance ratings develop over time. Fourth, future research should investigate relationships between TPD/EN scores and external indicators of PD effectiveness, such as observed teaching practices, teacher knowledge and beliefs, and student learning outcomes. Finally, the cluster patterns identified in this research should be replicated in larger samples to determine whether the observed patterns of alignment and misalignment between experienced (R) and perceived-importance (I) ratings are robust and generalisable. Overall, the findings offer a teacher-centred perspective on features associated with effective PD in the Latvian context and provide a foundation for further refinement, evaluation, and validation of the TPD/EN questionnaire.

Ethics Approval

Ethics Committee Name: Daugavpils University Humanities and Social Sciences Research Ethics Committee (Approval Code: Protocol No. 6, Approval Date: 27 May 2025)

Declaration of Interest

The authors declare no competing interests.

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