

IMPROVING THE PROFESSIONAL DEVELOPMENT OF ENGLISH LANGUAGE TEACHERS THROUGH PROBLEM-BASED LEARNING TECHNOLOGIES

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Abstract: This article presents a methodology for the continuous professional development of English language teachers through problem-based learning and reports evidence from its experimental evaluation. Uzbek studies of professional competence, foreign-language education, modern educational technologies, and problem-based instruction are critically compared to define the unresolved research gap. The quasi-experimental study involved 1,000 teachers equally assigned to control and experimental groups. A 25-item questionnaire was completed by 412 teachers in the experimental group, and 367 complete responses were included in multivariate analyses. At post-test, the proportion of teachers at the high level reached 25%, while the beginner level fell to 16% in the experimental group; the final group distributions differed significantly. Factor analysis supported an integrated professional-development construct comprising PBL knowledge, classroom application, professional problem solving, professional speaking in English, and reflection with feedback. Regression results identified reflection and PBL knowledge as the most stable predictors of professional English speaking. The findings support a professional-development cycle built around authentic pedagogical problems, collaborative analysis, facilitation, feedback, and reflective transfer to classroom practice.

Keywords: problem-based learning, English language teacher, professional development, pedagogical problem, reflection, facilitation, professional communication, feedback, quasi-experiment, effectiveness.

**Muammoli ta'lim texnologiyalari asosida
ingliz tili o'qituvchilarining kasbiy
rivojlanishini takomillashtirish**

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Annotatsiya: Maqolada muammoli ta'lim texnologiyalari asosida ingliz tili o'qituvchilarining uzluksiz kasbiy rivojlanishini tashkil etish metodikasi va uning tajriba-sinov samaradorligi yoritilgan. O'zbekistonlik olimlarning kasbiy kompetensiya, xorijiy til ta'limi, zamonaviy pedagogik texnologiyalar va muammoli o'qitishga doir ishlari tanqidiy-qiyosiy tahlil qilinib, mavjud ilmiy bo'shliq aniqlangan. Kvazi-eksperimental tadqiqotda 1000 nafar o'qituvchi nazorat va tajriba guruhlariga teng taqsimlangan. Tajriba guruhidagi 412 nafar pedagog 25 bandli so'rovnoman to'ldirgan, 367 ta to'liq javob ko'p omilli tahlilga kiritilgan. Yakuniy baholashda tajriba guruhida yuqori daraja 25 foizga yetib, boshlang'ich daraja 16 foizgacha kamaygan. Omilli tahlil kasbiy rivojlanishning besh komponentini integrativ tuzilma sifatida tasdiqlagan. Regressiya natijalari refleksiya va muammoli ta'limga oid bilim kasbiy inglizcha nutqning eng barqaror prediktorlari ekanini ko'rsatgan. Natijalar real pedagogik muammo, hamkorlikdagi tahlil, fasilitatsiya va qayta aloqaga asoslangan kasbiy rivojlanish siklining samaradorligini asoslaydi.

Kalit so'zlar: muammoli ta'lim, ingliz tili o'qituvchisi, kasbiy rivojlanish, pedagogik muam-

mo, refleksiya, fasilitatsiya, kasbiy muloqot, qayta aloqa, kvazi-eksperiment, samaradorlik.

Совершенствование профессионального развития учителей английского языка на основе технологий проблемного обучения

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Аннотация: В статье представлена методика непрерывного профессионального развития учителей английского языка на основе проблемного обучения и результаты ее экспериментальной проверки. Критически сопоставлены труды узбекских исследователей по профессиональной компетентности, иноязычному образованию, современным педагогическим технологиям и проблемному обучению; определен сохраняющийся научный пробел. В квазиэксперименте участвовали 1000 учителей, поровну распределенных между контрольной и экспе-

риментальной группами. Анкету из 25 пунктов заполнили 412 педагогов экспериментальной группы; 367 полных ответов включены в многомерный анализ. После программы доля высокого уровня в экспериментальной группе достигла 25 процентов, а доля начального уровня снизилась до 16 процентов. Факторный анализ подтвердил интегративную структуру пяти компонентов профессионального развития. Регрессионный анализ показал, что рефлексия и знания о проблемном обучении являются наиболее устойчивыми предикторами профессиональной англоязычной речи. Результаты обосновывают эффективность цикла профессионального развития, основанного на реальной педагогической проблеме, совместном анализе, фасилитации и обратной связи.

Ключевые слова: проблемное обучение, учитель английского языка, профессиональное развитие, педагогическая проблема, рефлексия, фасилитация, профессиональная коммуникация, обратная связь, квазиэксперимент, эффективность.

Sustained improvement in school education depends on teachers' capacity to examine their practice, update their professional knowledge, and make context-sensitive decisions about authentic classroom problems. Professional development therefore cannot be reduced to the transmission of ready-made recommendations. It needs to engage teachers in identifying a problem, collecting evidence, testing alternatives, receiving feedback, and evaluating the consequences of a decision. In Uzbekistan, Presidential Resolution No. PQ-231 on continuous professional development and the Professional Development Day and Professional Development Hour programme for English teachers provide a policy and organisational basis for practice-connected learning within schools [1; 15].

Problem-based learning (PBL) begins not with the delivery of decontextualised infor-

mation but with a complex situation that creates a need for inquiry. Barrows differentiates PBL approaches according to the structure of the problem, the level of teacher direction, and learner autonomy [3]. Savery identifies an authentic problem, self-directed inquiry, collaboration, and facilitation as defining features of PBL [19]. When these principles are transferred to teacher professional development, the teacher becomes an investigator of classroom practice rather than a passive recipient of methods.

For an English language teacher, this approach links two demanding areas: methodological decision-making and the ability to articulate professional reasoning in English. When teachers discuss a classroom case, they explain causes and consequences, justify claims, evaluate alternatives, and respond to colleagues' positions. Professional speaking is therefore treated

not as an isolated language exercise but as a tool for pedagogical reasoning. Goh and Burns conceptualise speaking as an integrated process of planning, organising meaning, performing, monitoring, and reflecting [6], while Richards emphasises purposeful listening and speaking within authentic communicative tasks [16].

The purpose of this study is to evaluate a PBL-based methodology for the professional development of practising English language teachers and to examine the internal psychometric structure of its associated questionnaire. Three questions guide the study: Do the control and experimental groups differ in professional outcomes at post-test? Does the 25-item instrument demonstrate acceptable reliability and construct coherence? Which components of professional development most strongly explain professional speaking in English? It was hypothesised that a cycle combining an authentic problem, collaborative analysis, facilitation, feedback, and reflective transfer would produce stronger outcomes than conventional training.

The theoretical logic of PBL rests on the construction of knowledge through connections between prior experience and newly sought evidence. Hmelo-Silver argues that PBL can jointly develop flexible knowledge, effective problem solving, self-directed learning, collaboration, and intrinsic motivation [8]. Yew and Goh describe it as a recursive cycle of understanding the problem, identifying learning issues, conducting self-directed study, sharing new knowledge, and evaluating a solution [20]. Jonassen further maintains that an educational problem should be sufficiently rich, open to more than one defensible solution, and structured so that learners must justify their decisions [10].

The authenticity of the problem is particularly important in teacher learning. Cases such as limited student talk, one-sentence responses, unequal participation in group work, or feedback reduced to error correction create a stron-

ger professional need to learn than an abstract methodological topic. Teachers can inspect evidence from the situation, distinguish symptoms from underlying causes, compare several methodological options, and select a response for classroom testing. In this way, new knowledge remains anchored in professional action.

Contemporary models of effective professional development emphasise content relevance, active learning, collaboration, models of practice, coaching, feedback, and sustained duration [4]. Díaz-Maggioli similarly places teachers' needs, professional histories, agency, and collegial learning at the centre of development [5]. PBL can integrate these conditions within one coherent cycle: the classroom problem establishes relevance; collaborative inquiry supports collective reasoning; facilitation sustains disciplined investigation; and enactment followed by reflection tests the practical value of the new decision.

Uzbek scholarship has addressed important parts of this agenda, and it would be inaccurate to claim that the field is unexplored. Jo'rayev examined pedagogical mechanisms for developing professional qualifications in in-service education [11], while Ruziyeva considered the continuous professional development of foreign-language teachers within changing professional requirements [17]. Safarova investigated the development of future teachers' professional competence through modern educational technologies [18]. Muslimov and Xolxodjaeva analysed the integration of professional competencies into foreign-language education [14]. Most directly related to the present study, Ismailova applied problem-based technology to the development of strategic competence among B2-level English learners [9]. These studies establish a valuable national foundation, but their emphases remain distributed across in-service mechanisms, pre-service competence, language-education integration, and learner strategic

competence. They do not yet provide an empirically tested, sustained PBL professional-development cycle specifically for practising school EFL teachers that integrates methodological decision-making, facilitation, professional speaking, feedback, and reflection. The present study addresses this narrower and clearly delimited gap rather than asserting an absence of Uzbek research.

Research on PBL in foreign-language education also suggests particular value for meaningful speaking. Ansarian and colleagues reported improvement in EFL learners' speaking proficiency through problem-based tasks [2]. A systematic review by Guo and colleagues found broadly positive effects of PBL on EFL learning, while also identifying variation in research design, implementation, and outcome measurement [7]. Moslemi Nezhad, Zarei, and Sarani showed that time, resources, lesson planning, and the demands of facilitation can limit teachers' use of problem-based language learning [13]. Consequently, explaining PBL to teachers is insufficient; professional development must allow them to design problems, formulate productive questions, facilitate interaction, and evaluate outcomes in practice.

The research synthesised by Moallem, Hung, and Dabbagh treats problem design, facilitation, assessment, and reflection as interdependent determinants of PBL quality [12]. Accordingly, the methodology evaluated here was constructed as an integrated cycle rather than a collection of separate techniques. Its phases were diagnostic problem identification, evidence-based observation, collaborative solution design, micro-enactment, criterion-referenced feedback, and reflective planning for transfer to the teacher's own classroom.

The study employed a quasi-experimental design supported by questionnaire data. The principal experiment involved 1,000 English language teachers from general secondary

schools: 500 in the control group and 500 in the experimental group. Because the groups were formed from existing regional and professional-development cohorts, the study is not presented as a fully randomised experiment. The pre-test established initial comparability, and the post-test measured professional outcomes following the intervention.

Professional performance was recorded at three levels—high, intermediate, and beginner—across four related criteria: professional-methodological competence; evidence-based professional communication; facilitation and group management; and reflective-analytical observation. Tasks required teachers to analyse a classroom case, formulate a problem question, justify a proposed solution, facilitate collaborative discussion, and revise practice in response to evidence.

The experimental programme followed a recurring problem-based cycle. Teachers first received an authentic case concerning student oral response, argumentation, participation, or feedback. They separated facts from assumptions, formulated problem questions, and identified knowledge needed to explain the situation. Groups studied relevant methodological resources, developed alternative solutions, and demonstrated a short lesson fragment or micro-teaching episode. Peer feedback and facilitator questions were then used to revise the solution, after which each teacher prepared a transfer plan for their own classroom. Professional English tasks required a logical progression from claim to reason, evidence, example, counter-position, and conclusion, together with appropriate pedagogical terminology.

A total of 412 teachers in the experimental group completed the 25-item questionnaire. The recorded regional distribution comprised 137 respondents from Tashkent, 132 from Namangan, and 109 from Bukhara; region was not recorded for 34 respondents. The instrument

Table 1.

Research design and data sources

Component	Participants	Instrument	Analysis
Main experiment	Control n=500; Experimental n=500	Pre- and post-test professional assessment	Percentages; χ^2 ; Welch t; relative coefficient
Questionnaire	412 responses; 367 complete cases	25 items; five-point Likert scale	α ; KMO; Bartlett; PCA; correlation; regression
Subgroup analysis	Complete and available cases	Region; experience; institution type	One-way ANOVA

Source: compiled by the author from the experimental data.

contained five subscales: PBL knowledge, PBL classroom application, professional problem solving, professional speaking in English, and reflection with feedback. Available responses were used for descriptive statistics and internal-consistency estimates, whereas analyses requiring all variables simultaneously were based on 367 complete cases.

Pearson's χ^2 test was used to compare level distributions. The three outcome levels were coded 1, 2, and 3, and post-test means were compared with Welch's t-test, which does not assume equal variances. Questionnaire reliability was estimated with Cronbach's α . Suitability for factor analysis was assessed with the Kaiser–Meyer–Olkin index and Bartlett's test of sphericity, followed by principal component analysis of the five composite subscales. A multiple linear regression model used professional speaking in English as the outcome and PBL knowledge, application, problem solving, and

reflection as predictors. Statistical significance was set at $p < .05$.

At pre-test, the control and experimental groups showed neither a practically meaningful nor a statistically significant difference. In the control group, 9.0% of teachers were at the high level, 49.0% at the intermediate level, and 42.0% at the beginner level. The corresponding figures in the experimental group were 8.4%, 50.6%, and 41.0%. Pearson's test yielded $\chi^2(2)=0.292$, $p=.864$, supporting baseline comparability.

Change in the control group at post-test was limited: the high level increased to 11.0%, while the beginner level fell to 37.0%. In the experimental group, the high level reached 25.0%, the intermediate level 59.0%, and the beginner level decreased to 16.0%. The association between group and post-test distribution was strong and statistically significant, $\chi^2(2)=71.033$, $p < .001$ (exact $p \approx 3.76 \times 10^{-16}$).

Table 2.

Distribution of professional outcomes by group and assessment stage

Stage and group	n	High	Intermediate	Beginner
Pre-test: Control	500	45 (9.0%)	245 (49.0%)	210 (42.0%)
Pre-test: Experimental	500	42 (8.4%)	253 (50.6%)	205 (41.0%)
Post-test: Control	500	55 (11.0%)	260 (52.0%)	185 (37.0%)
Post-test: Experimental	500	125 (25.0%)	295 (59.0%)	80 (16.0%)

Source: compiled by the author from the experimental data.

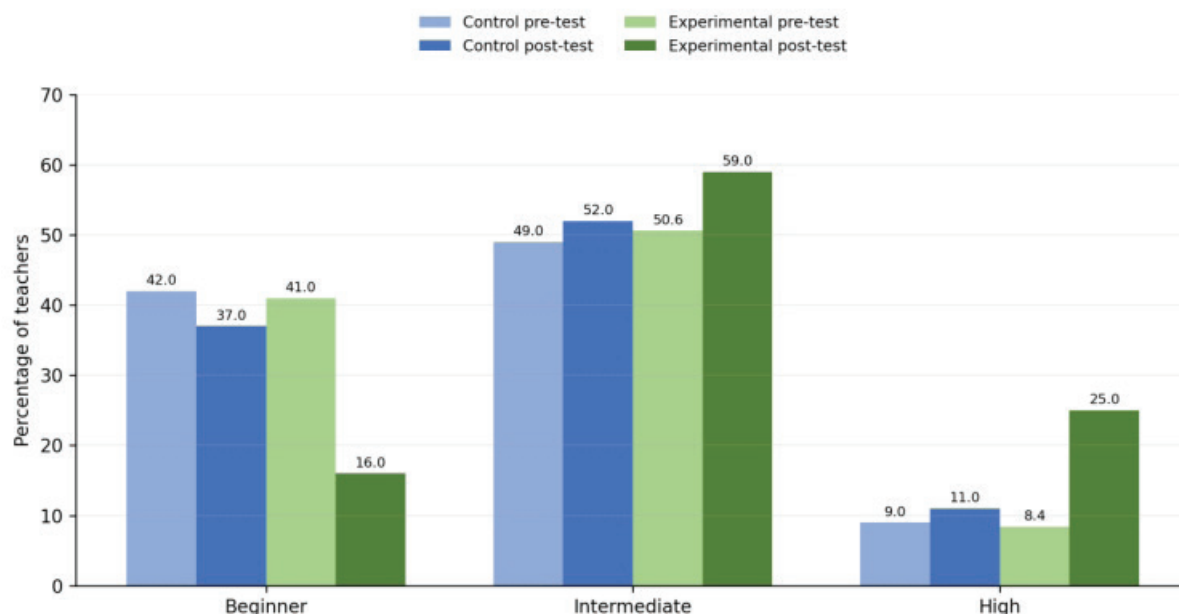


Figure 1. Professional outcome distributions by group and assessment stage
Source: compiled by the author from the experimental data.

With levels coded from 1 to 3, the weighted post-test mean was $M=1.74$ in the control group and $M=2.09$ in the experimental group; the corresponding variances were 0.4132 and 0.4027. Welch's statistic was $t=8.664$, well above the conventional critical value of 1.96 and significant at $p<.001$. The experimental group's weighted post-test score was 0.35 points higher, equivalent to 20.1% relative to the control mean ($\eta=1.2011$). This figure is a simple ratio of group means and must not be interpreted as a standardised effect size.

Questionnaire results indicated relatively strong perceptions of reflection with feedback, problem solving, and PBL application. Cronbach's α exceeded .80 for every subscale. The overall α for 25 items was .947, demonstrating high internal consistency. At the same time, such a high coefficient may indicate that some items are semantically close; future instrument refinement should therefore assess possible redundancy rather than treating a higher α as unconditionally better.

Table 3.

Descriptive and reliability statistics for questionnaire subscales

Subscale	Items	M	SD	Cronbach α	Valid n
PBL knowledge	5	3.58	0.79	0.801	403
PBL classroom application	6	3.77	0.75	0.861	399–404
Professional problem solving	4	3.79	0.83	0.815	403–406
Professional speaking in English	5	3.60	0.86	0.824	400–401
Reflection and feedback	5	3.84	0.83	0.868	401–403
Total scale	25	3.71	0.62	0.947	367 complete

Source: compiled by the author from the experimental data.

Before factor extraction, the KMO index was .861 and Bartlett's test of sphericity was significant, $\chi^2(10)=1302.28$, $p<.001$, indicating that the correlation matrix was appropriate for factor analysis. Principal component analysis produced one component with an eigenvalue greater than 1. Its eigenvalue was 3.689 and it explained 73.8% of the variance. All loadings exceeded .638, supporting the interpretation of the five domains as related dimensions of an overarching professional-development construct.

aking and the other subscales ranged from .544 to .621. Professional speaking was thus connected to the broader construct while retaining sufficient distinctiveness to be modelled as an outcome.

The multiple regression model for professional speaking in English was statistically significant, $F(4,362)=67.15$, $p<.001$, $R^2=.426$, adjusted $R^2=.420$. Thus, the model explained 42.6% of outcome variance. With the other predictors controlled, reflection with feedback ($B=.440$)

Table 4.

Factor loadings of professional-development components

Component	Loading	Interpretation
PBL classroom application	0.908	Very high
Professional problem solving	0.909	Very high
Reflection and feedback	0.855	High
PBL knowledge	0.763	High
Professional speaking in English	0.638	Adequate to high

Source: compiled by the author from the experimental data.

All subscale correlations were positive and significant at $p<.001$. The strongest relationship was between PBL classroom application and professional problem solving, $r=.836$. Problem solving correlated with reflection at $r=.786$, and application correlated with reflection at $r=.756$. Correlations between professional English spe-

and PBL knowledge ($B=.260$) retained significant independent contributions. Although PBL application and problem solving had strong bivariate relationships with speaking, their unique coefficients were not significant when their shared variance with the other predictors was considered.

Table 5.

Regression model explaining professional speaking in English

Predictor	B	SE	t	P
Intercept	0.730	0.182	4.00	<.001
PBL knowledge	0.260	0.064	4.06	<.001
PBL classroom application	0.019	0.087	0.22	.829
Professional problem solving	0.044	0.083	0.53	.598
Reflection and feedback	0.440	0.071	6.20	<.001

Source: compiled by the author from the experimental data.

Variance inflation factors ranged from 2.17 to 4.13, providing no evidence of severe multicollinearity. The Breusch–Pagan result, $LM=2.73$, $p=.604$, did not indicate a serious heteroscedasticity problem. With robust standard errors, PBL knowledge remained significant ($B=.260$, robust $SE=.081$, $p=.001$), as did reflection ($B=.440$, robust $SE=.088$, $p<.001$). These checks strengthen confidence in the two predictors while not converting an observational regression relationship into a causal claim.

Among 343 complete regional records, the total-scale mean was $M=3.934$ ($SD=.597$) in Bukhara, $M=3.644$ ($SD=.595$) in Namangan, and $M=3.661$ ($SD=.803$) in Tashkent. One-way ANOVA yielded $F(2,340)=5.95$, $p=.003$, with the clearest adjusted pairwise difference between Bukhara and Namangan. Differences by teaching experience, $F(3,320)=1.80$, $p=.128$, and institution type, $F(2,362)=2.92$, $p=.055$, did not reach the conventional .05 threshold. The available evidence therefore does not justify attributing programme benefit only to years of experience or type of institution.

The principal experimental result is a shift from beginner performance towards intermediate and high performance in the PBL group. Baseline equivalence followed by a substantial post-test difference is consistent with the programme theory of change. Nevertheless, the quasi-experimental design does not completely rule out contributions from school context, facilitator expertise, attendance intensity, or other unmeasured factors. The findings support effectiveness under the observed implementation conditions, not an unrestricted causal claim for every setting.

The pattern can be interpreted through PBL's mechanism of activating a need for knowledge through a problem. Flexible knowledge and problem-solving processes described by Hmelo-Silver [8], self-directed inquiry and

facilitation emphasised by Savery [19], and the recursive inquiry cycle reviewed by Yew and Goh [20] were embedded in the intervention. Because participants not only analysed a problem but also converted a proposed solution into a lesson action, declarative methodological knowledge was connected to professional performance.

The national research comparison sharpens the contribution of the study. Ismailova's work demonstrates the potential of problem-based technology for strategic language competence [9]; Safarova shows how modern technologies can support professional competence [18]; Jo'rayev and Ruziyeva locate teacher development within in-service and continuous professional learning [11; 17]; and Muslimov and Xolxodjaeva connect professional competence to foreign-language education [14]. The present evidence does not replace these studies. It links their previously separated concerns in a PBL cycle designed for practising EFL teachers and tests that cycle through both performance outcomes and psychometric analysis. This is a claim of integration and empirical specification, not a claim that Uzbek scholarship has ignored the topic.

The emergence of one common questionnaire component indicates that the professional-development domains did not function in isolation. Particularly high loadings for application, problem solving, and reflection show that activity and reconsideration of practice were central to participants' experience. This aligns with the active, collaborative, model-rich, coached, and feedback-oriented features identified by Darling-Hammond, Hyler, and Gardner [4], as well as Díaz-Maggioli's emphasis on teacher need and professional context [5].

Reflection with feedback was the strongest independent predictor of professional speaking in English. This suggests that professional

speech should not be reduced to vocabulary or grammatical accuracy. When teachers interpret a pedagogical situation, listen to a colleague, reconsider a decision, and formulate a revised position, the content and organisation of their speech become more precise. The independent contribution of PBL knowledge further suggests that understanding the nature of the problem, the facilitator's role, inquiry questions, and assessment criteria provides cognitive support for structuring professional discourse. This interpretation is compatible with approaches that treat speaking as purposeful, strategic, and reflective activity [6; 16].

The non-significant unique coefficients for application and problem solving should not be read as evidence that these domains are unimportant. Their bivariate associations with speaking were positive, and they were strongly correlated with each other and with reflection. Multiple regression estimates only the part of each predictor that is not shared with the others. Accordingly, the model locates unique explanatory variance in knowledge and reflection while the broader correlation pattern supports an interconnected professional-learning system.

The regional result cautions against mechanical replication of one training script. Facilitator preparation, frequency of meetings, collaborative culture, and access to methodological resources should be investigated as possible implementation moderators. The organisational and pedagogical barriers reported by Moslemi Nezhad and colleagues [13] offer plausible hypotheses for future analysis. A common programme core can be retained while problem banks, scaffolding, observation tools, and facilitation support are adapted to local needs.

Several limitations require explicit recognition. First, participants were not individually randomised. Second, the questionnaire relied

on self-report in the experimental group, and only 367 of 412 returned questionnaires were complete across all variables. Third, significant tests of non-normality for some subscales require parametric results to be interpreted alongside the large sample and distributional shape. Fourth, region was missing for 34 respondents. Future studies should use school-level cluster designs, delayed follow-up, independent classroom observations, lesson video evidence, and student speaking outcomes to test the durability and transfer of the methodology.

The PBL-based professional-development methodology integrated professional-methodological action, evidence-based communication, facilitation, and reflective analysis within one recurring practice cycle. In the experiment involving 1,000 teachers, the groups were comparable at baseline, whereas the post-test distribution differed significantly in favour of the experimental group. The proportion at the high level reached 25%, and the beginner level fell to 16% in the experimental group.

Questionnaire data from 412 respondents clarified possible internal mechanisms of the methodology. The 25-item instrument showed high reliability, and five subscales converged on a common professional-development factor. Reflection with feedback and PBL knowledge were stable predictors of professional speaking in English. Improving teachers' professional speech therefore requires more than additional speaking practice: teachers need to interpret pedagogical problems, justify decisions, receive feedback, and reformulate professional reasoning.

For practical implementation, Professional Development Day and Professional Development Hour sessions can follow eight connected steps: select an authentic classroom problem; distinguish evidence from assumption; formulate inquiry questions; study relevant resources;

construct alternative solutions collaboratively; test a solution through microteaching; provide criterion-referenced feedback; and prepare a reflective transfer plan. The facilitator should guide inquiry through questions and evidence rather than provide the solution in advance. Assessment should jointly address methodological quality, professional communication, facilitation, and reflection.

Overall, the methodology reframes continuous professional development as a recurring process of inquiry and improvement within

school practice rather than an event that ends with a course. The reviewed Uzbek studies provide an important conceptual and methodological foundation; the specific contribution of the present study is to integrate those strands into a PBL cycle for practising English teachers and evaluate it with a large quasi-experimental sample. Wider implementation should prioritise facilitator preparation, regional adaptation, a regularly updated bank of professional problems, and systematic observation of subsequent classroom practice.

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