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ENERGIZING TEACHER EDUCATION AND PROFESSIONAL DEVELOPMENT WITH PROBLEM-BASED LEARNING

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Abstract: Teacher education and professional development are most effective when they move beyond the transmission of theoretical knowledge and engage teachers in solving authentic classroom problems. Problem-Based Learning (PBL) offers a powerful pedagogical framework for this purpose because it places real or realistic professional challenges at the center of learning. In PBL, teachers and pre-service teachers analyze complex situations, identify learning needs, investigate possible solutions, collaborate with peers, and reflect on their pedagogical decisions. This article discusses how PBL can energize teacher education and professional development by strengthening pedagogical content knowledge, reflective thinking, collaboration, problem-solving competence, and professional agency. Drawing on established research on PBL and effective teacher professional development, the article argues that PBL can bridge the gap between theory and practice and make teacher learning more relevant, active, and transformative.

Keywords: Problem-Based Learning, teacher education, professional development, pedagogical competence, reflective practice, teacher learning

Introduction

Teacher education and professional development play a central role in improving the quality of teaching and learning. However, many traditional teacher training programs still rely heavily on lectures, theoretical explanations, and general methodological recommendations. Although such approaches may provide useful information, they often fail to prepare teachers for the unpredictable and complex realities of classroom practice. Teachers face problems related to student motivation, mixed-ability classrooms, classroom management, assessment, inclusion, technology integration, and curriculum adaptation. Therefore, teacher learning should be organized around real pedagogical challenges rather than abstract content alone.

Problem-Based Learning offers an effective response to this need. PBL was originally developed in medical education, but its principles are now widely applied in different educational fields. Barrows explained that PBL is not one single method but a family of approaches in which learning begins with a problem and develops through inquiry, reasoning, and self-directed learning. In teacher education, this means that future or practicing teachers do not simply study teaching theories; they learn to use theory as a tool for analyzing and solving professional problems. PBL is especially relevant for teacher professional development because effective professional learning should be content-focused, collaborative, practice-based, supported by expert guidance, and sustained over time. Darling-Hammond, Hyler, and Gardner identify these features as essential elements of effective teacher professional development. PBL naturally integrates many of these characteristics because teachers work together on authentic problems, test ideas, receive feedback, and reflect on the results.

Theoretical Background of Problem-Based Learning

Problem-Based Learning is grounded in constructivist learning theory. According to this perspective, learners actively construct knowledge through experience, inquiry, interaction, and reflection. In PBL, learning does not begin with ready-made answers. Instead, learners are

presented with a problematic situation that requires analysis and investigation. Hmelo-Silver explains that students in PBL work collaboratively to identify what they need to learn, engage in self-directed learning, apply new knowledge to the problem, and reflect on both the solution and the learning process.

This structure is particularly valuable in teacher education because teaching itself is a problem-solving profession. A teacher must constantly interpret classroom situations, make decisions, adapt instruction, and evaluate outcomes. For example, a pre-service teacher may be given the following problem: "Students in a mixed-ability English class are not participating equally in speaking activities. Some learners dominate the discussion, while others remain silent." Instead of receiving a direct answer from the instructor, teacher candidates analyze the situation, identify possible causes, study relevant theories, design strategies, and justify their pedagogical decisions.In this process, the role of the teacher educator changes. The instructor becomes a facilitator rather than a direct transmitter of knowledge. Hmelo-Silver notes that the facilitator in PBL models effective learning and thinking strategies, supports inquiry, and scaffolds learning through questioning. This is very important for teacher education because future teachers not only learn content but also experience a learner-centered model that they can later apply in their own classrooms.

PBL in Teacher Education

Teacher education should prepare future teachers to connect theory with practice. However, one of the common weaknesses of teacher preparation programs is the separation between university-based theoretical courses and real classroom experience. PBL helps reduce this gap by using professional scenarios, case problems, and classroom-based dilemmas as the starting point for learning.

Akl's review of PBL in teacher education concluded that PBL experiences can help pre-service teachers develop knowledge and professional skills simultaneously, including content knowledge, pedagogical content knowledge, and understanding of how learners learn. This is important because effective teaching requires more than knowing subject matter. Teachers must know how to transform content into teachable material, how to respond to learner difficulties, and how to select suitable methods for different contexts.

For example, in an English language teacher education program, PBL can be used through the following professional problem:

A group of ninth-grade students can understand grammar rules in written exercises, but they cannot use them accurately in speaking. The teacher wants to improve students' oral fluency without ignoring accuracy. What should be done?

This problem requires teacher candidates to connect knowledge of grammar teaching, communicative language teaching, error correction, fluency development, learner psychology, and assessment. Through PBL, they learn not only "what method exists" but also "which method is appropriate, why it is appropriate, and how it can be adapted."

PBL also strengthens professional language and reasoning. Research on PBL in teacher education has shown that pre-service teachers who work through problems in groups can improve their use of professional vocabulary and become more careful in explaining pedagogical decisions. This means PBL supports not only practical competence but also academic and professional discourse.

PBL in Professional Development

Professional development for practicing teachers should be directly connected to classroom realities. Teachers are more likely to engage deeply in training when they see that the content responds to their real needs. Generic lectures may provide information, but they often do not

change classroom practice. PBL can make professional development more meaningful because it begins with the problems teachers actually face.

For example, a PBL-based professional development session may begin with a case such as:

Many students complete written assignments successfully but avoid speaking in English during lessons. The teacher uses pair work and group work, but participation remains low. How can the teacher redesign the lesson to increase meaningful communication?

Teachers can work in groups to diagnose the problem, identify possible reasons, study relevant methodological resources, design an intervention, and present a solution. After trying the solution in practice, they can return to the group for reflection and feedback. This cycle makes professional development active, contextual, and reflective.

McConnell, Parker, and Eberhardt describe PBL as a useful framework for responsive and transformative teacher professional development because it engages teachers in learning activities organized around common PBL structures and supports changes in content knowledge and pedagogical practice. This shows that PBL is not limited to student learning; it can also serve as a model for teacher learning.

PBL-based professional development also corresponds to the features of effective teacher learning identified by Darling-Hammond and colleagues: collaboration, modeling, coaching, feedback, reflection, and sustained duration. In this sense, PBL can transform professional development from a one-time seminar into an inquiry-based professional learning process.

Benefits of PBL for Teacher Learning

PBL energizes teacher education and professional development in several important ways. First, it develops **reflective practice**. Teachers learn to examine classroom situations critically, question assumptions, and make evidence-informed decisions. Instead of asking only "What should I teach?", they begin to ask "Why is this problem happening?", "What evidence do I have?", and "Which strategy is most appropriate?"

Second, PBL improves **problem-solving competence**. Since teachers regularly face complex and ill-structured problems, they need the ability to analyze situations from multiple perspectives. PBL develops this ability because problems usually do not have one simple answer. Third, PBL strengthens **collaboration**. Teachers learn from one another by discussing cases, comparing experiences, and co-constructing solutions. This is especially important in professional development because experienced teachers often possess valuable practical knowledge that can be shared through collaborative inquiry.Next, PBL supports **pedagogical content knowledge**. Teachers do not study theory separately from practice; they apply theoretical concepts to classroom problems. As a result, knowledge becomes functional and professionally meaningful. Finally, PBL increases **motivation and professional agency**. Teachers become active participants in their own learning. They are not passive recipients of training content; they become investigators, designers, and evaluators of pedagogical solutions.

Designing PBL-Based Teacher Education and Professional Development

For PBL to be effective in teacher education and professional development, it should be carefully designed. The following structure can be used:

1. **Problem presentation**

Teachers are introduced to a realistic classroom problem, case, or scenario.

2. **Problem analysis**

Participants identify the key issue, possible causes, and missing information.

3. **Learning questions**

Teachers formulate what they need to learn in order to solve the problem.

4. **Independent and collaborative inquiry**

Participants study theories, methods, curriculum documents, research findings, or classroom evidence.

5. **Solution design**

Groups develop a teaching strategy, lesson plan, assessment tool, or professional action plan.

6. **Presentation and peer feedback**

Teachers present their solutions and receive feedback from peers and facilitators.

7. **Reflection and improvement**

Participants evaluate the strengths and limitations of their solution and revise it if necessary.

This model can be adapted for both pre-service teacher education and in-service professional development. In university courses, it can be used with student teachers through simulated classroom cases. In professional development courses, it can be used with real problems collected from teachers' classroom experience.

Challenges of Implementing PBL

Although PBL has many advantages, its implementation may be challenging. First, it requires careful preparation. The problem must be authentic, complex, and connected to learning objectives. If the problem is too simple, it will not stimulate deep inquiry. If it is too broad, participants may become confused.

Second, teacher educators and trainers need facilitation skills. In PBL, the facilitator should not dominate the discussion or provide immediate answers. Instead, the facilitator should guide participants through questions, feedback, and scaffolding.

Third, assessment can be difficult. Traditional tests may not fully capture the outcomes of PBL. Therefore, assessment should include rubrics, reflective journals, group presentations, portfolios, lesson plans, and classroom-based evidence.

Fourth, time management is important. PBL usually requires more time than lecture-based instruction because participants need to analyze, investigate, discuss, and reflect. However, this time investment is justified if the goal is deep professional learning rather than superficial content coverage.

Conclusion

Problem-Based Learning can significantly energize teacher education and professional development by making teacher learning more active, practical, collaborative, and reflective. It helps bridge the gap between theory and classroom practice by placing authentic pedagogical problems at the center of learning. Through PBL, teachers develop not only methodological knowledge but also the ability to analyze classroom situations, collaborate with colleagues, design solutions, and reflect on professional decisions. In modern education, teachers need more than ready-made methods. They need adaptive expertise, critical thinking, creativity, communication, and collaborative problem-solving. PBL provides a strong framework for developing these professional qualities. Therefore, teacher education institutions and professional development centers should integrate PBL into training programs, methodological courses, workshops, and continuous professional learning systems.

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