REVIEW

# The Implementation of Project-Based Learning in Chinese Basic Education: Challenges and Recommendations

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***Abstract**: Project-based learning is a form of student-centered and inquiry-based learning. It differs from traditional instructional approaches by emphasizing students' acquisition of transferable knowledge through active exploration of real-world problems and challenges. For China's basic education community, project-based learning is still a relatively novel notion, and its popularization is subject to a variety of challenges. This study aims to pinpoint the barriers to the successful implementation of this pedagogical method in Chinese basic education. Recommendations on how to enhance its application are also proposed.*

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PROJECT-BASED LEARNING (PBL), as a student-centered instructional strategy, has gained increasing popularity across the globe. The core idea of PBL is that students acquire a deeper understanding of knowledge by engaging in exploring real-world issues. It is believed that PBL has the potential to boost students' academic competence as well as promote their mastery of 21st-century skills such as critical thinking, teamwork, and problem-solving (Wei, 2023). The PBL method emphasizes the teacher's role as a guide and facilitator in encouraging student active engagement in learning. Nevertheless, Chinese basic education teachers encounter challenges in implementing effective PBL due to their insufficient PBL knowledge and teaching techniques, as well as the lack of necessary resources. This study seeks to identify the current barriers to the adoption of PBL and put forward relevant recommendations for promoting its application in Chinese basic education.

## A Brief Overview of PBL

Dewey is recognized as one of the early proponents of project-based education, and his idea of "learning by doing" has been a key principle underlying PBL (Dewey, 1938). Later educational research has advanced this idea of teaching and learning into an instructional approach known as "project-based learning." Today, PBL has become a well-established method of active learning in which students learn about a subject by working for an extended period of time in teams to investigate and solve a complex real-world question or issue (Shen, 2023). It typically entails a series of steps, including identifying the issue, posing questions, researching relevant knowledge, investigating possible solutions, representing the chosen solution, and reviewing and reflecting on the inquiry process (Huang, 2022). Central to PBL is students' autonomous inquiry, during which they develop new knowledge in relation to actual life and integrate knowledge from multiple disciplines to address genuine challenges. Compared with traditional teacher-centered classroom instruction, PBL, with an emphasis on students' hands-on and collaborative experiences, is significantly more effective in developing students' problem-solving abilities.

In the *NMC Horizon Report: 2015 K–12 Edition*, a joint effort of the US's New Media Consortium (NMC) and Consortium for School Networking (CoSN), experts reached the agreement that future education would place a high premium on exploring deeper learning approaches, such as PBL and inquiry-based learning (Johnson, 2015). At present, countries, including the United States, the United Kingdom, France, Canada, Singapore, and more, have tried to infuse essential elements of PBL into curriculum development and teaching practices. PBL has been adopted at all levels of schooling, from preschool to higher education. Moreover, it is heavily employed by a group

of emerging educational institutions such as Think Global Schools and Khan Lab Schools (Ye, 2022).

Since its introduction into China's education community, PBL has garnered growing attention among Chinese educational researchers and teachers, as well as policymakers. The "Opinion on Advancing Education and Teaching Reforms and Comprehensively Improving the Quality of Compulsory Education," issued in 2019, strongly advocates the exploration and implementation of PBL, among other collaborative learning strategies (State Council of China, 2019a). The "Guiding Opinions of the General Office of the State Council on Promoting the Reform of Education Methods in General Senior Secondary Education in the New Era" affirm the necessity of innovating classroom teaching modalities, particularly emphasizing situation-specific, problem-based learning activities, and project-based integrated study (State Council of China, 2019b). Both papers highlight PBL as a crucial device for transforming the traditional education paradigm to improve the quality of education. Driven by the intensifying educational reform and advancement of educational concepts, an increasing number of schools are starting to pay attention to the PBL model and introduce it into classroom teaching. In recent years, amid the accelerated development of information technology, PBL in Chinese schools has exhibited a tendency towards digitization and multi-disciplinary integration. Furthermore, some educational institutions have initiated collaboration with businesses and communities to provide students with richer, more authentic project-based learning experiences in an effort to support the holistic development of students (Liu, 2022).

# Barriers to the Implementation of PBL in Chinese Basic Education

Despite its many advantages, PBL is a relatively new teaching model for Chinese teachers. Its implementation in Chinese basic education has been constrained by various factors, such as the established curricula, teacher PBL literacy, and resource availability.

## *Current Curricula's Focus on Knowledge Foundations*

At the basic education level in China, subject-based curricula place heavy emphasis on students' attainment of a solid knowledge base. Nevertheless, PBL is a more competence-oriented, interdisciplinary approach, focusing on student all-round development. Under the current education context and evaluation system that focus on basic knowledge mastery, the teacher is faced with a dilemma in adopting PBL in day-to-day instruction (Yin, 2021). The subject-based curriculum is distinguished by its logical structure and independent content knowledge specific to each individual discipline. It pri-

oritizes the efficiency of knowledge transmission. To a large extent, subject-specific training restricts the breadth of thinking in students, hindering their overall development of essential competences such as inquiry and problem-solving abilities (Qiao, 2021). Contrarily, PBL is often based on big ideas or compelling social topics, drawing on lessons from several disciplines and being implemented in the form of modules. It also stresses that the question of exploration must have real-world applications. Evidently, PBL will inevitably weaken the fulfillment of the subject-based curriculum by disrupting the established knowledge structure and student learning progression, thus not conforming to the requirements of the national basic education curriculum. Therefore, a remarkable challenge of PBL in basic education is how to balance students' building of complete knowledge bases with their needs for developing key competences (Yin, 2021).

## *Teachers' Inability to Change Their Roles in Education*

In a traditional education paradigm, the teacher plays a dominant role in the whole process of instruction; the classroom's effectiveness depends on the teacher's instructional techniques (Kang, 1986). In contrast, PBL is a student-centered process, aiming to maximize the student's engagement and motivate them to become the owners of their learning. First, PBL requires the teacher to be a participant in student learning instead of a knowledge transmitter. As opposed to their traditional role as a lecturer, the teacher in a PBL classroom needs to be involved in every process of student learning, covertly mediating the objective, progress, and method of students' inquiry. They must relinquish their dominating, authoritative position to build an equalitarian, democratic learning atmosphere for the students (Yang & Guan, 2012). Second, the teacher needs to experience a transition from a material user to a project initiator. Teaching according to the textbook is no longer acceptable; rather, the teacher must be a competent developer of learning projects (Lyu, 2022). PBL is typically driven by a real-world issue or challenge. That means the teacher must be sufficiently sensitive and perceptive in life to spot the appropriate issue as the theme of PBL. Also, the design of PBL practices requires that the teacher have both disciplinary expertise and interdisciplinary horizons (Yao, 2023). Third, PBl means a shift in the teacher's role from an executor of teaching plans to a manager and evaluator of learning projects. Traditional instruction is a step-by-step, linear process, following a prescribed teaching plan (Qiao, 2021), whereas PBL is an open, dynamic process without a definite pattern to follow, which necessitates project management on the part of the teacher throughout all procedures. In addition, PBL is mainly evaluated by formative assessments. It is necessary for the teacher to adopt multi-dimensional evaluation, including student self-assessment, peer assessment, and teacher evaluation, to cover diverse aspects

of student PBL performance, such as engagement levels, collaborative skills, and creativity (Yang & Guan, 2012). All these transitions from the roles of a traditional educator are difficult to reach for the majority of teachers in the short term, which hinders the popularization of PBL in Chinese basic education.

### *Limitations of Fixed School Schedules and Reachable Resources*

The allocation of school time and resources is contingent on the curriculum program and course standards. Traditionally, to successfully complete teaching content in time, the teacher needs to meticulously manage the periods allocated to their course according to the course plan (Ji, 1999). However, PBL entails a lot of project design, coordination, and evaluation work in the classroom, consuming far more classroom time than traditional teaching methods. Under the PBL teaching paradigm, the teacher is not only responsible for teaching students' disciplinary knowledge but also for creating learning projects and directing students in their implementation. Specific duties associated with PBL teaching, including determining the theme, developing detailed plans, organizing resources, and monitoring project progress, consume extra time and significantly increase the teacher's workloads (Hu &Tian, 2023).

Teachers under the traditional instruction paradigm select teaching resources, such as teaching materials, courseware, aids, and experimental apparatus, according to the course standards (Xia, 2011). PBL often requires more teaching resources regarding experimental materials and technical tools, which are not always available within the school; sometimes, it may need resource support from external experts. In situations where the school cannot provide adequate support, the teacher may have to seek out teaching materials and tools, as well as partnerships and financial support from outside the school. These factors may frighten teachers away from adopting PBL (Yang & Feng, 2007).

## Causes Underlying the Challenges of PBL in Basic Education

### *Inflexible Curriculum Structure*

The curriculum structure is concerned with the organization and planning of relevant courses and activities conducted at a certain level of education. A reasonable structure of curriculum is instrumental in achieving the efficacy and quality of PBL (Wu, 2022). Currently, the rigid structure of the Chinese

basic education curriculum has become an impediment to the implementation of PBL in China.

The development of basic education curriculum in China has undergone five stages: the subject-focused "Soviet-style" curriculum, labor-focused "social practice" curriculum, politics-dominated "political education" curriculum, natural science-focused "natural science" curriculum, and decentralized and integrated curriculum. The "Nine-Year Compulsory Education Curriculum Program for Ordinary Primary and Junior Secondary Schools (Trial)" stipulates that the basic education curriculum framework should include both subject-based courses and activity courses. The principle of "one uniform curriculum, multiple choices of textbook" has been supportive to the development of elective courses and practical activity courses to a certain extent (Yin & Gong, 2020). Despite curricular reforms like these, the current curriculum structure based on the discipline-specific evaluation mechanism is still insufficiently flexible for popularizing PBL.

## *Pressures of High-Stakes Examinations*

The pressure of high-stakes examinations is one of the primary factors confounding the adoption of PBL in basic education. Under an examination-oriented education system, student academic results are the main consideration in teacher and student evaluation. Teachers and students tend to work hard for ideal test scores, disregarding the significance of practical applications of knowledge. In this context, PBL is often viewed as a practice irrelevant to students' school progression (Zhao, 2023).

Other outdated notions of education also have negative impacts on the popularization of PBL. For example, learning is traditionally seen as a process of passive reception of knowledge on the part of students, where the teacher is responsible for imparting knowledge. This notion is directly related to the rejection of PBL by teachers and student parents, who believe that there is a lack of structured delivery of content knowledge by the teacher in PBL and that students are likely to become aimless in learning, unable to master essential information and skills (Wang, 2017).

## *Insufficient PBL Instruction Ability of Teachers*

Student PBL learning outcomes largely depend on the PBL design and organizational capacities of the teacher. Currently, the majority of basic education teachers have not developed an in-depth, systematic understanding of PBL as a pedagogical method. That leads to them deviating from the spirit of PBL when designing learning projects, making it difficult to achieve its educational value. Also, teachers must possess certain amounts of interdisciplinary knowledge and integration ability to implement PBL instruction. How-

ever, some of them may only have single discipline-based knowledge, thus being unqualified to design proper teaching plans for PBL, an instructional strategy with interdisciplinary features. Furthermore, PBL requires enhanced skills in classroom management, resource integration, coaching and mentoring, etc. on the part of the teacher. Teachers without all-round skills may find it difficult to adopt PBL in their in-class instruction (Gao, 2023).

## *A Paucity of Organizational Support*

In PBL, students and teachers need a far wider variety of resources than in the traditional learning mode. They could be additional learning materials, apparatus, opportunities for on-site investigations, or even financial support (Wei, 2022). The school's support is crucial for accessing these resources. Somehow, the reading materials that the school library can provide and the technical expertise that the majority of basic education schools possess cannot meet the requirements of PBL instruction (Yang & Feng, 2007).

In the meantime, the lack of evaluation mechanisms that pertain to PBL is also a discouragement to its practical applications. The traditional examination-based evaluation method is not suitable for PBL. Without effective evaluation instruments, teachers and students can hardly develop adequate motivations for implementing PBL (Zhao, 2023). In addition, some schools develop PBL lessons merely for public demonstration to showcase their advantages in educational methods. That poses negative impacts on teachers' attitudes towards PBL in that these projects are mainly for publicity purposes rather than genuine explorations, severely deviating from PBL's instructional value (Zheng, 2021).

# Recommendations for Improving the Implementation of PBL in Basic Education

## *Modifying the Curriculum Structure*

Revising the curriculum structure is crucial to the reform of basic education, involving the adjustment and upgrading of basic curricular components and their interrelationships (Wang & Liu, 2015). Current curricula implemented by all schools are based on the national basic education curriculum program, which represents the essential requirements of the state for the qualities and competences of its citizens. Hence, the fulfillment of the objectives of the national curriculum program should underlie all school-based curricula (Wang & Liu, 2015). However, the existing curricular arrangement is not favorable for the implementation of PBL. It is imperative to conduct some key revisions to make the curriculum more open and inclusive to facilitate

integrated and interdisciplinary study and the association of knowledge with actual reality. Such a curriculum reform has the potential to transform the traditional instruction paradigm, fundamentally changing teaching and learning patterns (Yin & Gong, 2022).

## *Enhancing Teacher PBL Literacy*

Heightening teachers' PBL instruction competence is critical to its successful implementation among basic education students, as teachers act as the organizers, participants, and supporters of PBL (Yang & Guan, 2012). First off, it is important for the school to provide PBL literacy training to teachers before its across-the-board adoption. Through the training program, the teacher has the chance to comprehend PBL's significance and value in basic education and to develop interest in and confidence in PBL instruction. Alongside the school-based training, cross-school exchange also gives the teacher the opportunity to observe and contemplate PBL in PBL teaching settings. This is helpful in increasing the teacher's exposure to excellent PBL practices and the possibilities of their learning from the successful experiences of peers. In addition, it is advisable to introduce the "mentoring system" into PBL literacy training, under which those "PBL activists" can receive intensive training first and then lead their colleagues at large in the PBL implementation (Wang, 2009).

At the same time, it is important for the teacher to continuously upgrade their knowledge repertoire and increase teaching design capacities in order to create challenging, deeper-learning-inciting PBL protocols for their students (Cui, 2022). To do so, the teacher should voluntarily read an extensive range of books and journal articles on PBL and study excellent PBL cases. They can also leverage abundant online resources to enrich their theoretical knowledge about PBL and PBL implementation skills so as to practice PBL instruction with more positive attitudes.

## *Strengthening Resource Backing for PBL*

The implementation of PBL is a complex task involving extensive resources, including information, apparatus, technical support, specialized funding, and more (Feng & Zhu, 2003). The school should expand its collection of professional books and journals on education sciences to facilitate teachers' acquisition of PBL-related knowledge. As for those PBL projects that require external expert and funding support, the school should mobilize organizational resources to reach partnerships with relevant experts and businesses.

In the IT era, the use of digital technologies can significantly boost the outcomes of PBL (Zhang, 2022). The school should increase its investment in digital resources, which will bring substantial benefits to teachers'

and students' PBL activities. Cutting-edge information technologies, such as the cloud collaboration platform, virtual reality, and augmented reality, can enhance the implementation of PBL by providing more diverse learning scenarios and richer, more interactive learning experiences. Teachers can adopt learning analytics to gain a better understanding of students' academic positions, thereby making more precise and targeted PBL instruction protocols. Educational technology will help teachers monitor students' progress and adjust teaching strategies accordingly to advance PBL in a more reasonable manner. With online learning platforms, students can access more technical tools and information for their PBL activities and enjoy more flexible and efficient PBL without temporal and spatial constraints.

## *Incorporating PBL in the Evaluation Framework*

Teachers' and students' attitudes towards PBL are determined by the components of education evaluation in some way (Zhao, 2023). Based on their own special circumstances, schools should modify their teacher evaluation system to incorporate PBL competence as an indicator of teacher performance and establish a specialized incentive mechanism to activate teachers' interest in engaging in PBL instruction.

PBL is aimed at promoting student learning of essential concepts and principles and augmenting their key competences, such as innovative, exploratory, and collaborative abilities, through authentic problem solving. Accordingly, the student evaluation system should also be updated with the change in educational requirements. A multi-dimensional evaluation approach that is more focused on student holistic growth than merely on their exam results should be developed to facilitate the assessment of PBL's educational outcomes.

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