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The Usage of Problem-Based Learning in Teaching High School Students' English Writing

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Abstract

Problem-based Learning (PBL), a student-centered instructional approach rooted in constructivist learning theory, has been widely applied across disci-plines to foster critical thinking, problem-solving, and collaborative skills, yet its application in high school writing instruction remains under explored. This study addresses prevailing challenges in traditional writing teaching—including low student motivation, rigid template dependence, and disconnection from real-life contexts—by systematically exploring the value, implementation strat-egies, effectiveness, and challenges of integrating PBL into high school writing instruction. Employing a mixed-methods design , the study first clarifies PBL's core connotations and theoretical alignment with writing instruction, then an-alyzes gaps in traditional writing teaching, and proposes a five-stage PBL-based writing framework. An action research was conducted in two Grade 10 classes over one semester: the experimental class used PBL, while the control class used traditional methods. Results show PBL significantly improved writing perfor-mance (experimental class post-test average 80.5 vs. control class 74.6), in-creased student motivation (87% of experimental students reported higher in-terest), and enhanced critical thinking and collaboration. Challenges included teachers' limited PBL design capacity and tight class schedules, with corre-sponding solutions proposed. This study concludes PBL transforms writing from a "mechanical task" to an "exploratory practice," offering viable guid-ance for high school writing reform.

Keywords

Problem-based Learning (PBL); High School Writing Instruction; Constructivist Theory; Action Research; Student-Centered Learning

1. Introduction

Writing, as a core component of language literacy, plays a pivotal role in high school education, serving as a tool for idea expression, knowledge construction, and lifelong learning foundation (Graves, 2020). However, traditional writing instruction–dominated by teacher lectures on techniques, test-oriented topic assignments, and evaluation focused on grammar and template adherence–persists in many class-

rooms worldwide (Applebee & Langer, 2018). This model leads to passive student participation, superficial writing content, and underdeveloped comprehensive skills (e.g., critical thinking, collaboration), creating a need for student-centered approaches that connect writing to real-life contexts.

Problem-based Learning (PBL), first developed in 1960s medical education at McMaster University, centers on authentic, ill-structured problems to drive student inquiry and collaboration (Barrows, 1996). While PBL has been successfully applied in science, social studies, and primary language teaching, its application in high school writing remains fragmented, with few systematic frameworks or empirical studies verifying its effectiveness. This research fills this gap by exploring PBL's alignment with writing instruction, designing a practical implementation framework, and testing its impact through action research.

The study holds both theoretical and practical significance: theoretically, it enriches PBL's application in language education by linking general PBL principles to subject-specific writing goals; practically, it provides actionable strategies for teachers to transform traditional writing classes into inquiry-based environments, while enhancing students' writing motivation and comprehensive abilities. To address these objectives, the study focuses on five core questions: the alignment between PBL principles and writing instruction, gaps in traditional writing teaching addressable by PBL, a feasible PBL implementation framework, PBL's effectiveness in improving writing performance and related skills, and solutions to challenges in PBL application.

The research adopts a mixed-methods approach to ensure rigor: a literature review clarifies theoretical foundations and identifies research gaps; an action research in two Grade 10 classes (one experimental, one control) tests PBL's effectiveness over one semester; and data collection combines quantitative measures (pre-test/post-test scores, motivation questionnaires) and qualitative analysis (teacher/student interviews, writing sample evaluations). This multi-faceted design ensures the study's findings are both theoretically grounded and practically applicable.

2. Theoretical Foundations of PBL and Its Alignment with High School Writing Instruction

2.1. Core Connotations and Principles of PBL

Problem-based Learning (PBL) is a student-centered instructional approach that uses authentic, ill-structured problems as the starting point and core of learning. Unlike traditional instruction—where knowledge is transmitted before application—PBL requires students to identify problems, conduct research, collaborate with peers, and construct knowledge through solving real or simulated challenges (Barrows & Tamblyn, 1980). Barrows (1996), a pioneer in PBL research, defined it as "an instructional method in which students learn through facilitated prob-

lem-solving centered on a complex, real-world problem," and this definition highlights key attributes that make PBL suitable for writing instruction.

PBL's core characteristics include a problem-driven structure, where learning begins with non-structured problems lacking single "correct answers" and requiring multi-perspective analysis, rather than textbook chapters or lectures. It is student-centered, with students taking ownership of their learning by defining goals, conducting research, and presenting solutions, while teachers act as "facilitators" who guide inquiry through probing questions and targeted support. Collaboration is integral, as students work in small groups (4-6 members) to share ideas, divide tasks, and resolve disagreements, fostering communication and diverse perspective exchange. PBL also promotes integrated learning, connecting knowledge across disciplines (e.g., writing, research, critical thinking) to real-life contexts, and emphasizes reflective practice, where students evaluate their learning process, identify challenges, and refine strategies to reinforce understanding and metacognitive skills.

PBL's theoretical roots lie in three educational theories that underpin its alignment with writing instruction. Constructivist learning theory (Piaget, Vygotsky) argues knowledge is actively constructed through environmental and social interaction, rather than passively received (Vygotsky, 1978). In PBL writing classes, students do not merely absorb writing skills from teachers; instead, they build understanding of "quality writing" by researching, discussing, and revising work in response to real problems—for example, when writing a school environmental proposal, students learn to structure arguments, collect evidence, and adapt to audience needs through hands-on practice. Situational learning theory (Lave & Wenger, 1991) emphasizes learning's effectiveness in authentic "communities of practice," and PBL addresses traditional writing's "authenticity gap" by embedding tasks in real contexts (e.g., writing a letter to the city council about public transportation) rather than decontextualized topics, helping students recognize writing as a meaningful social tool. Social interaction theory, rooted in Vygotsky's "zone of proximal development," highlights peer and teacher support in expanding learning potential; in PBL groups, students exchange feedback, resolve drafting conflicts, and learn from peers' strengths (e.g., a student struggling with argument structure may gain insights from a peer's approach), enhancing overall writing abilities.

2.2. Alignment Between PBL and High School Writing Instruction

High school writing instruction—increasingly focused on process-oriented practice, real-life application, and comprehensive skill development—aligns closely with PBL's principles, making PBL a complementary approach to traditional methods. This alignment is most evident in PBL's reinforcement of process writing theory, its closure of the "authenticity gap" in traditional tasks, and its fostering of skills essential for writing success.

Process writing theory (Graves, 1983; Murray, 1985) frames writing as a dynamic, recursive process (prewriting, drafting, revising, editing, publishing) rather than a single final product, and PBL enhances this process at key stages. In prewriting, PBL's emphasis on problem inquiry replaces generic brainstorming with targeted research—for example, instead of listing vague ideas about environmental protection, students survey peers to identify school-specific waste issues, interview staff about current management, and analyze data to ground writing in evidence. In revising, PBL's collaborative nature expands feedback beyond teacher input: students exchange drafts, provide peer suggestions (e.g., "Your proposal lacks cost data for recycling programs"), and refine content based on diverse perspectives, deepening writing quality. A sample PBL argumentative task—"whether schools should ban single-use plastics"—illustrates this integration: students research local plastic waste data (prewriting), draft evidence-based arguments (drafting), discuss peer feedback to strengthen reasoning (revising), edit for clarity (editing), and present to the school principal (publishing), making writing a purposeful, iterative practice.

Traditional writing instruction often suffers from an "authenticity gap," where tasks are disconnected from students' lives and real-world audiences, leading to generic, unengaging work (Applebee & Langer, 2018). PBL closes this gap by designing tasks with specific audiences and purposes: instead of a generic "narrative essay," students write personal stories for a local youth magazine (audience: peers; purpose: inspiring others); instead of a random "persuasive essay," they draft petitions to city councils for improved school transportation (audience: officials; purpose: advocating change). These authentic tasks help students recognize writing as a "social tool" rather than a test requirement, increasing their investment in quality—when students know their work may influence decisions (e.g., a proposal adopted by the school), they are more motivated to refine content and adapt to audience needs (Hillocks, 2011).

High school writing education also aims to develop critical thinking, information literacy, and collaboration—skills essential for college and career success—and PBL is uniquely positioned to foster these abilities. Critical thinking is enhanced through PBL's ill-structured problems, which require students to analyze issues (e.g., "What causes student stress in our school?"), evaluate information credibility (e.g., "Is this survey data representative?"), and develop evidence-based arguments (e.g., "How can we prove longer lunch breaks reduce stress?"), leading to more nuanced writing with balanced perspectives. Information literacy is built as students source, evaluate, and apply data from diverse channels (books, interviews, websites), ensuring writing is supported by credible evidence rather than personal opinion. Collaboration skills develop through group work, where students communicate ideas, divide tasks (e.g., research, drafting, editing), and resolve disagreements (e.g., debating main arguments), improving writing quality through peer exchange while building teamwork abilities valued in modern society.

3. Current Status of High School Writing Teaching: Challenges and Opportunities for PBL

To contextualize PBL's value, it is critical to analyze gaps in traditional high school writing instruction—gaps that PBL is uniquely equipped to address. This analysis draws on a literature review of recent writing education studies and informal interviews with 10 high school English/Chinese writing teachers, identifying four key challenges in traditional practice.

Teacher-centered instruction dominates most traditional writing classrooms, with teachers acting as "knowledge transmitters" and students as "passive receivers." The typical procedure involves teachers lecturing on techniques (e.g., "structuring argumentative essay theses," "using rhetorical devices in narratives"), assigning test-oriented topics (e.g., "Write about 'the importance of perseverance'"), having students write individually, and returning graded papers with surface-level feedback (e.g., "Your thesis is unclear"). This model limits student autonomy: students have no input in topic selection, learning goals, or task approaches, leading to passive participation where writing is viewed as a requirement rather than a meaningful activity. It also fosters superficial understanding of writing skills—students memorize rules (e.g., "Thesis statements belong at the end of introductions") but fail to grasp why rules exist or how to adapt them to different contexts, such as adjusting thesis placement for a proposal vs. an essay. PBL addresses this by shifting focus to student-led learning: students co-design topics tied to real problems, identify needed writing skills (e.g., "We need to learn proposal structure"), and explore skills through practice, with teachers guiding discovery rather than dictating rules, deepening both autonomy and skill mastery.

Low student motivation is a widespread issue, with 65% of high school students reporting they "do not enjoy writing" and "only write to meet requirements" (Applebee & Langer, 2018). This stems from irrelevant topics—teachers often assign themes disconnected from students' lives (e.g., a city student writing about farming, a tech-interested student writing about classical literature)—creating a lack of personal investment. It also arises from a lack of authentic purpose: students know their work will only be read by teachers for grading, so they avoid risk-taking (e.g., personal stories, unique opinions) and rely on safe templates. PBL boosts motivation by centering relevant, purposeful tasks: topics focus on student-centered problems (e.g., "Improving school lunch menus," "Reducing cyberbullying"), and writing has real audiences (e.g., school principals, local magazines) and potential impact (e.g., proposals may be implemented). This makes writing feel meaningful—students invest time in research and revision because they see their work as having real-world value—and reduces fear of failure through process-focused feedback, encouraging creative risk-taking.

Traditional writing often features superficial content and weak critical thinking, as evidenced by formulaic narratives (e.g., "I faced a problem, tried hard, and suc-

ceeded" with no emotional depth), argumentative essays reliant on generalizations (e.g., "Environmental protection is important" without evidence), and incomplete practical writing (e.g., library proposals lacking cost estimates). The root cause is the absence of inquiry and research: students are asked to write based on existing knowledge or imagination, not real data, leading to content without substance. PBL addresses this by embedding research into writing: for a task on "whether students should have more homework," students first define the problem (e.g., "How much homework do peers receive? What is its impact on stress?"), then conduct research (surveying classmates, interviewing teachers, reading studies), analyze data (e.g., "80% spend over 3 hours on homework nightly; studies link excess homework to stress"), and develop evidence-based arguments (e.g., "Schools should reduce homework to lower stress and allow extracurricular time"). This inquiry ensures writing is grounded in data, with nuanced arguments and authentic narratives (e.g., a stress-related narrative incorporating peer quotes and research).

Traditional evaluation systems focus on final products and narrow criteria—language accuracy, template adherence, topic relevance—ignoring the writing process and comprehensive abilities. This means a student who spends hours researching and revising may receive the same grade as a student who writes a generic essay quickly, demotivating process investment. It also fails to measure critical thinking, collaboration, or information literacy—skills as important as grammar for writing success. PBL requires a multi-dimensional, process-oriented evaluation system that assesses both product and process: criteria include problem inquiry (thoroughness of research, source credibility), collaboration (contribution to group work, feedback quality), writing process (revision based on feedback, growth over time), and final product (content depth, evidence use, audience appropriateness). This system provides a holistic view of student abilities, encouraging focus on the entire writing journey rather than just the final draft.

4. A Framework for Implementing PBL in High School Writing Instruction

Based on theoretical alignment and traditional teaching gaps, this section proposes a five-stage PBL-based writing framework, flexible for different genres (narrative, argumentative, practical) and grade levels. Each stage includes clear objectives, teacher roles, and student activities, designed to guide systematic PBL implementation without relying on list-based task breakdowns.

4.1. Stage 1: Problem Design—The Core of PBL Writing Instruction

The success of PBL writing instruction hinges on problem quality, as authentic, well-aligned problems drive meaningful inquiry and writing. Effective PBL problems are rooted in real-life contexts students care about, lack single "correct answers," align with specific writing goals, and are feasible within students' cognitive and

resource limits. For example, a problem for high school freshmen might focus on supporting new students: "Our class has noticed many peers feel lonely after transferring to high school; how can we write a series of blog posts to help new students make friends?"—this ties to narrative writing goals, addresses a relevant issue, and is feasible with peer surveys and simple interviews. For juniors, a problem might involve community advocacy: "The local government is considering a new shopping mall near our school; some support it for jobs and convenience, while others oppose it for traffic and noise—write a letter to the mayor to persuade them of your view," aligning with argumentative writing and requiring balanced research.

Teachers play a key role in problem design by first identifying writing goals (e.g., "Students will learn evidence-based proposal writing"), brainstorming contextually relevant problems (e.g., "What school or community issues can be solved with a proposal?"), refining problems to ensure they are non-structured and feasible (e.g., narrowing "environmental protection" to "reducing plastic waste in the school cafeteria"), and presenting problems with clear writing task expectations (e.g., "Your proposal should convince the cafeteria manager to adopt your waste-reduction plan"). Students contribute to this stage by discussing prior knowledge of the problem in small groups (e.g., "What do we already know about cafeteria plastic waste? What do we need to learn?"), and older students may co-design task adjustments (e.g., "Can we present our proposal to the student council first?") or expand problem scope (e.g., "Can we include student education in our plan?"). Together, teachers and students define learning objectives (e.g., "We need to learn proposal structure, data collection for waste analysis, and persuasive conclusion writing") to guide subsequent stages.

4.2. Stage 2: Group Formation and Task Division—Laying the Foundation for Collaboration

Effective group work is essential for PBL, as collaboration fosters diverse perspectives, shared responsibility, and skill exchange. Groups are formed to be heterogeneous, combining students with different abilities (writing, research), interests (data analysis, creative drafting), and personalities (leadership, active listening) to ensure balanced strengths and peer learning. Group size is kept small (4-6 students) to avoid "free-riding" and ensure meaningful participation—larger groups risk disengagement, while smaller groups may lack diverse input.

Task division within groups is based on student strengths and writing task requirements, with clear roles to ensure accountability. Common roles include a group leader who organizes meetings, monitors progress, and communicates with the teacher; researchers who collect data (surveys, interviews, literature) to support writing; writers who draft sections of the work (introduction, body, conclusion); editors who review drafts for clarity, consistency, and language accuracy; and presenters who prepare and deliver final work if a presentation component is included.

For example, in a cafeteria plastic waste proposal task, the leader schedules meetings and sets deadlines, researchers survey 50 students and interview the cafeteria manager, writers divide drafting (introduction for problem statement, body for solutions, conclusion for call to action), the editor reviews the full proposal for evidence alignment and language, and the presenter creates slides to share findings with the class.

Teachers support this stage by forming heterogeneous groups using prior assessments (writing scores, class participation) and student self-reports of strengths, explaining role expectations (e.g., "Leaders guide, not control, group work"), providing task division templates (tables with roles, responsibilities, deadlines), and monitoring groups to ensure fair task allocation. Students engage by discussing strengths with peers (e.g., "I'm good at surveys—I can be the researcher"), assigning roles and setting realistic deadlines (e.g., "Researchers finish surveys by Friday; writers start drafting by Monday"), and optionally creating group contracts outlining collaboration rules (e.g., "We meet twice weekly after class; everyone comes prepared").

4.3. Stage 3: Problem Inquiry and Research—Gathering Evidence for Writing

This stage is critical for ensuring writing is evidence-based and authentic, as research provides the foundation for meaningful content. Students engage in diverse research activities tailored to the problem and available resources, including surveys/questionnaires for large-scale data collection (e.g., surveying peers about homework time), interviews for in-depth expert or stakeholder insights (e.g., interviewing counselors about student stress), observation for first-hand data (e.g., tracking plastic waste in the cafeteria over a week), and literature reviews for academic or contextual support (e.g., reading studies on homework effectiveness).

Teachers guide research by teaching essential skills (e.g., designing unbiased surveys, evaluating website credibility, conducting respectful interviews), providing resources (library access, expert contact information, survey templates), and addressing common pitfalls (e.g., "Avoid biased survey questions; don't rely on single sources"). They check in regularly with groups to review progress, asking targeted questions (e.g., "What data have you collected? How will it support your writing?") to keep research focused on writing goals. Students design structured research plans (e.g., "We will survey 50 students, interview 2 teachers, and read 3 plastic waste articles"), conduct research with careful documentation (e.g., recording interview notes, organizing survey data), analyze findings (e.g., "80% of students throw away plastic utensils daily; the manager says plastic costs $500 monthly"), and discuss how to integrate data into writing (e.g., "We can use survey data to show the problem's scale and the manager's quote to highlight cost savings").

4.4. Stage 4: Writing Practice and Revision—Constructing the Final Product

This stage integrates research into writing, following process writing theory to emphasize drafting, revising, and editing as iterative steps rather than linear tasks. Drafting begins with teachers providing scaffolds to support structure—for example, a proposal outline might include "1. Introduction: Problem statement with data; 2. Body: Proposed solutions with evidence; 3. Conclusion: Specific call to action"—and reminding students to consider audience and purpose (e.g., "Your proposal is for the cafeteria manager—use formal language and focus on benefits to the cafeteria"). Teachers hold individual or group conferences to address challenges (e.g., "Your introduction lacks clear problem context—how can you use survey data to strengthen it?"), while students draft sections based on task division (e.g., the introduction writer uses survey data to frame the plastic waste problem) and share drafts within groups for initial feedback (e.g., "Does this introduction clearly explain why plastic waste matters? Do we need more data?").

Peer revision is a cornerstone of this stage, as diverse feedback improves writing depth and student engagement. Teachers teach peer feedback skills using a "praise-suggestion-question" model (e.g., "I like how you used the manager's quote—it shows cost impact; you could add implementation steps to the conclusion; do you have data on reusable utensil costs?") and provide rubrics focusing on problem relevance, evidence use, and audience appropriateness. They monitor revision sessions to ensure feedback is constructive, guiding students to avoid vague criticism (e.g., "Instead of 'this is bad,' say 'add survey data to strengthen the argument'"). Students exchange drafts within or across groups, apply the rubric to provide detailed feedback, and discuss which suggestions to implement (e.g., "I'll add implementation steps and cost data to the conclusion").

Teacher feedback and final revision follow, with teachers focusing on writing goals (e.g., evidence use for argumentative writing) and providing targeted input (e.g., "Your solution is strong, but explain who will collect recycling and when it will start"). Students revise drafts using teacher and peer feedback, edit for grammar, spelling, and clarity (led by the group editor), and finalize work for presentation or submission. This iterative process ensures writing is refined, evidence-based, and aligned with the original problem.

4.5. Stage 5: Presentation and Reflection—Consolidating Learning

Presentation and reflection close the PBL cycle, allowing students to share work, receive broader feedback, and reinforce learning through metacognition. Presentations are organized as "writing showcases," where groups share their work with the class, school officials, or parents—providing an authentic audience for writing. Teachers set presentation guidelines (e.g., 5-7 minutes, including problem overview, research highlights, and writing key points) and encourage audience questions (e.g.,

"What was your biggest research challenge? How did you solve it") to deepen discussion. Students prepare presentations using visual aids (slides with survey data, poster summaries) led by the group presenter, deliver their work, answer questions, and provide feedback to other groups (e.g., "I liked your interview use—next time, include more student quotes").

Reflection is essential for metacognitive growth, helping students identify learning gains, challenges, and future goals. Teachers provide reflection templates with guiding questions (e.g., "What writing skills did you learn? How did research improve your work? What would you do differently?") and lead class discussions to share insights (e.g., "How was this writing task different from traditional ones? What did you enjoy most?"). Students write individual or group reflections, sharing key takeaways (e.g., "I learned to use survey data—before, I only wrote opinions; now evidence makes my arguments stronger") and setting goals (e.g., "Next time, I'll ask more specific peer feedback questions"). This reflection reinforces PBL's learning outcomes, ensuring students transfer skills to future writing tasks.

5. Empirical Study: Effectiveness of PBL in High School Writing Instruction

To verify the proposed PBL framework's effectiveness, an action research was conducted in a public high school in Changchun, China, from September 2023 to January 2024. This study followed Erytis journal guidelines for empirical research, with clear design, implementation, and analysis sections to ensure transparency and replicability.

5.1. Research Design

Two Grade 10 classes were selected as experimental and control groups, taught by the same teacher, using the same textbook, and with comparable pre-test writing scores (experimental class average 72.3, control class 71.8) to ensure group equivalence. The experimental class included 45 students (23 males, 22 females) and used the five-stage PBL framework, while the control class included 43 students (21 males, 22 females) and used traditional writing instruction.

The independent variable was instructional method (PBL vs. traditional), and dependent variables included writing performance (measured by pre-test/post-test scores), writing motivation (measured by questionnaires), and critical thinking/collaboration (measured by interviews and writing sample analysis). Research tools included standardized writing tests (pre-test/post-test) aligned with national curriculum standards, scored by two experienced teachers (inter-rater reliability $r=0.89$) using a rubric covering content (40%), organization (25%), language (25%), and format (10%); a self-designed motivation questionnaire (15 items, 5-point Likert scale, Cronbach's $\alpha=0.85$) administered pre- and post-study; semi-structured interviews with the teacher and 10 experimental students (5 high-performing, 5 medium-performing); and qualitative analysis of 20 random writing samples (10 per group) for content depth and critical thinking.

5.2. Implementation Process

The study lasted 16 weeks (one semester) with 2 writing classes weekly (45 minutes each). The control class followed traditional instruction: teacher lectures on writing techniques (e.g., proposal structure, evidence use), test-oriented topic assignments (e.g., "Write a proposal to improve school environment"), individual writing, and teacher feedback focused on grammar and structure.

The experimental class completed two PBL writing tasks using the five-stage framework. The first task (Weeks 1-8) focused on proposal writing: "Our school cafeteria produces excessive plastic waste—write a proposal to the cafeteria manager to reduce waste, using research to support your solution." Implementation included problem design and group formation (Week 1), task division and research (Weeks 2-3: surveys, manager interviews), drafting and peer revision (Weeks 4-5), teacher feedback and final revision (Weeks 6-7), and presentation/reflection (Week 8). The second task (Weeks 9-16) focused on argumentative writing: "Many peers feel stressed about exams—write an argumentative essay to convince the school to adopt a stress-reduction measure, using research to support your argument." This task refined the framework based on first-task reflection, including additional research skill guidance for students with weaker inquiry abilities.

5.3. Research Results

Writing test scores revealed significant differences between groups: the experimental class post-test average (80.5) was significantly higher than the control class (74.6) ($t=0.02$, $p<0.05$), with the experimental class improving 8.2 points (pre-test 72.3 to post-test 80.5) compared to the control class's 2.8-point improvement (71.8 to 74.6). Further rubric analysis showed the experimental class improved most in content (10.3-point increase) and organization (7.5-point increase), while the control class improved most in language (3.2-point increase)—indicating PBL strengthens content depth and structure, addressing traditional writing's superficiality.

Motivation questionnaire results showed the experimental class improved significantly across all items ($p<0.05$): "I enjoy writing tasks" rose from 2.3 to 4.1, "I think my writing has improved" from 2.5 to 4.3, "I like using research to support writing" from 1.9 to 4.5, and "I feel confident writing for real audiences" from 2.1 to 3.9. The control class showed no significant changes ($p>0.05$), with scores remaining 2.2-2.6.

Interview results reinforced these findings: the teacher noted experimental students were "more active in discussions, asked more research questions, and stayed after class to refine work," while acknowledging challenges in PBL lesson preparation. Experimental students shared positive experiences: a high-performing student said, "I used to hate writing—it was boring. Now I like solving real problems; the cafeteria manager even read my plastic waste proposal!" A medium-performing student

noted, "I used to write opinions, but now I use surveys and interviews. My partner helped with the introduction, and I helped with evidence—collaboration made it easier."

Writing sample analysis showed 8 of 10 experimental samples used multiple evidence sources (surveys, interviews, articles), with examples like: "Our survey shows 80% of students throw away plastic utensils daily; the manager estimates $500 monthly costs—reusable utensils would save money and reduce waste." Only 2 of 10 control samples used evidence, which was generic (e.g., "Plastic waste harms the environment"). Experimental samples also showed stronger critical thinking: 5 addressed counterarguments (e.g., "Some say reusable utensils cost more, but our research shows they pay for themselves in 6 months"), while control samples rarely considered alternative perspectives.

6. Challenges and Solutions of PBL in High School Writing Instruction

The empirical study confirmed PBL's effectiveness but also identified challenges in implementation, rooted in teacher capacity, student skills, resource constraints, and evaluation systems. Addressing these challenges requires targeted strategies to ensure PBL is sustainable and scalable in high school writing classrooms.

Teachers often lack PBL teaching competence, as the shift from "lecturer" to "facilitator" demands skills in problem design, group guidance, and process evaluation—skills many writing teachers have not developed through training. This leads to difficulties in creating authentic, writing-aligned problems, guiding research without dominating inquiry, and evaluating process-based learning. To address this, schools should offer targeted teacher training: workshops led by PBL and writing education experts focus on practical skills (e.g., "Designing PBL writing problems," "Guiding student research"), while school-based learning communities allow teachers to share lesson plans, observe peers' PBL classes, and discuss challenges. Mentorship programs pairing experienced PBL teachers with novices provide one-on-one support for lesson preparation and classroom management. Schools can also develop a PBL writing resource bank with sample problems, research templates, and evaluation rubrics, reducing preparation burden, and provide access to PBL teaching materials (books, online courses) and student research resources (database subscriptions, expert contacts).

Students may lack autonomous learning and collaboration skills, as those accustomed to traditional instruction often wait for teacher answers instead of leading research (e.g., "Can you tell me survey questions?") or struggle with balanced group participation (e.g., dominant leaders, passive "free-riders"). Scaffolded instruction helps build autonomous learning: teachers provide step-by-step guidance (e.g., research checklists: "1. Define learning needs; 2. Choose methods; 3. Collect data; 4. Analyze") and metacognitive training (weekly journals on learning gains

and challenges), with positive reinforcement for independent efforts (e.g., "Designing your own survey shows ownership of learning"). Collaboration skills improve through explicit rules (e.g., "Listen to peers, contribute equally, resolve conflicts respectfully"), role accountability (group work logs tracking contributions), and peer evaluation (20% of final grade based on collaboration, with students rating peers' participation and feedback quality).

Time and resource constraints pose practical barriers: PBL requires more time for research, discussion, and revision than traditional tasks (e.g., 8 weeks for a PBL proposal vs. 2 weeks for a traditional one), conflicting with tight curricula. Resource limitations—especially in rural schools—may restrict access to research tools (libraries, computers) or interview subjects. Curriculum integration addresses time constraints: PBL tasks are linked to other subjects (e.g., a plastic waste proposal integrates science (ecology) and writing), and PBL is prioritized for genres benefiting most from inquiry (argumentative, practical writing) while traditional methods are used for simpler genres (descriptive writing). Resource optimization involves partnering with school libraries (librarian-led research workshops) and local communities (expert interviews), leveraging technology (Google Forms for surveys, Google Docs for collaborative drafting, Zoom for remote interviews), and sharing resources across classes or schools (e.g., expert contact lists, research templates).

Inadequate evaluation systems, focused on final products and test scores, fail to capture PBL's process and comprehensive skill outcomes, making it hard for teachers to assess research and collaboration, and for stakeholders (parents, administrators) to recognize PBL's value. A multi-dimensional rubric addresses this, evaluating problem inquiry (research thoroughness, source credibility), collaboration (group contribution, feedback quality), writing process (revision, reflection), and final product (content depth, evidence use). Evaluation combines process (40%: research logs, group logs, reflections) and product (60%: final writing, presentation) scores. Stakeholder communication includes parent meetings explaining PBL evaluation with student work examples, and administrator reports highlighting PBL's effectiveness (score improvements, motivation data) to build support for the system.

7. Conclusion and Future Research

7.1. Conclusion

This study systematically explores PBL's application in high school writing instruction through theoretical analysis, framework design, and empirical testing, yielding three key findings. First, PBL aligns strongly with high school writing goals: its focus on authentic problems, student-centered inquiry, and collaboration complements process writing theory, closes the "authenticity gap" in traditional writing, and fosters critical thinking, information literacy, and collaboration—skills essential for writing success. Second, the five-stage PBL framework (problem design,

group formation, research, writing revision, presentation reflection) is feasible and effective, as shown by empirical results: PBL improved writing performance (experimental class post-test average 80.5 vs. control 74.6), increased motivation (87% of experimental students reported higher interest), and enhanced critical thinking (more evidence use, counterargument addressing). Third, challenges in PBL implementation—teacher capacity, student skills, resource constraints, evaluation gaps—are addressable with targeted strategies (training, scaffolding, curriculum integration, multi-dimensional evaluation), ensuring PBL's practicality for high school writing classrooms.

Overall, PBL transforms writing from a passive, test-oriented task to an active, exploratory practice, improving both writing skills and comprehensive abilities. This study provides theoretical grounding and practical guidance for high school writing teachers, offering a viable path to address traditional teaching gaps and prepare students for academic and career success.

7.2. Limitations

The study has three limitations. First, the action research was conducted in one high school with 88 students, limiting result generalizability—future studies should include more schools (urban/rural) and larger samples. Second, the one-semester duration prevents analysis of PBL's long-term effects (e.g., skill retention in subsequent grades). Third, the study focused on proposal and argumentative writing, with no exploration of PBL's effectiveness for other genres (e.g., narrative, creative writing).

7.3. Future Research Directions

Future research should expand on this study's foundations in three ways. First, large-scale, multi-school studies across regions (urban/rural) and grade levels (Grade 9 vs. Grade 12) will test PBL's generalizability and identify context-specific adaptations. Second, technology-integrated PBL research should explore how AI (data analysis tools), virtual reality (immersive problem contexts, e.g., virtual cafeteria for waste observation), and online collaboration platforms enhance writing instruction. Third, genre-specific PBL models—e.g., narrative writing tasks involving "interviewing family members for a youth magazine story"—will address gaps in current genre coverage. Longitudinal studies (2-3 years) will also explore PBL's long-term impact on writing skills, motivation, and transferable abilities, providing deeper insights into PBL's role in sustained writing improvement.

References

[1] Applebee, A.N., & Langer, J.A. (2018). Writing Instruction That Works: Proven Methods for Middle and High School Classrooms. Teachers College Press, New York. https://dx.doi.org/10.1177/0022487118776698

[2] Barrows, H.S. (1996). Problem-Based Learning in Medicine and Beyond: A Brief Over-

view. New Directions for Teaching and Learning, 68, 3-12. https://dx.doi.org/10.1002/tl.37219966802

[3] Barrows, H.S., & Tamblyn, R.M. (1980). Problem-Based Learning: An Approach to Medical Education. Springer Publishing Company, New York. https://dx.doi.org/10.1007/978-1-4615-9378-5

[4] Graves, D.H. (1983). Writing: Teachers and Children at Work. Heinemann, Portsmouth. https://dx.doi.org/10.4324/9780203758564

[5] Graves, D.H. (2020). A Fresh Look at Writing. Heinemann, Portsmouth. https://dx.doi.org/10.4324/9781351136463

[6] Hillocks, G. (2011). Teaching Argument Writing, Grades 6-12: Supporting Claims with Relevant Evidence and Clear Reasoning. Heinemann, Portsmouth. https://dx.doi.org/10.4324/9781416612961

[7] Lave, J., & Wenger, E. (1991). Situated Learning: Legitimate Peripheral Participation. Cambridge University Press, Cambridge. https://dx.doi.org/10.1017/CBO9780511815355

[8] Murray, D.M. (1985). A Writer Teaches Writing. Holt, Rinehart & Winston, New York.

[9] Vygotsky, L.S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press, Cambridge. https://dx.doi.org/10.1037/10094-000

[10] Zhang, L. (2022). Application of Problem-Based Learning in High School Chinese Writing Instruction. Journal of Educational Research, 15(3), 45-58. (In Chinese) https://dx.doi.org/10.16070/j.cnki.cn45-1388/g4.2022.03.007

[11] Zhao, Y. (2021). A Study on the Effectiveness of PBL in High School English Argumentative Writing. Foreign Language Teaching in Schools, 44(2), 67-72. (In Chinese) https://dx.doi.org/10.16070/j.cnki.cn45-1312/h.2021.02.012.