Journal of Balkumari College
ISSN 2467-9321 (Print), ISSN 2738 -957X (Online) Website: http://balkumaricollege.edu.np/journal
Volume : 14 Issue: 1 June 2025, Page No. 89-96

Investigating the Effectiveness and Implementation Challenges of Project-Based Learning: A Case Study of Public School Teachers in Chitwan, Nepal

Ananta Dhungana
Lecturer, Balkumari College, TU
Email: ananta.dhungana@bkc.edu.np

ABSTRACT

The paper explores the effectiveness of Project-Based Learning (PBL) as an active learning strategy in Nepal, examining its impact on student engagement, skill development, and long-term learning outcomes within the country's diverse educational contexts. Employing a qualitative approach, the study engaged 20 teachers from urban and rural public schools, covering disciplines such as English as a Foreign Language, Information and Communication Technology, and science. Qualitative data from teacher interviews and document review revealed challenges, including lack of teacher training, resource shortages, sociocultural barriers like gender and caste discrimination, and high costs, alongside facilitators such as teacher motivation, curriculum flexibility, and community involvement. Proposed solutions include professional development workshops, cost-effective project models, parental engagement, and curriculum reforms. The study concludes that PBL holds transformative potential for Nepal, fostering 21st-century skills and aligning with global standards, with recommendations for systemic support to ensure sustainable, inclusive implementation.

Keywords: Project-Based Learning (PBL), Student Engagement, Sociocultural Barriers, Teachers Training, Teachers Motivation

Introduction

Project-Based Learning (PBL) represents a dynamic and student-centered instructional approach that moves beyond the traditional confines of passive learning. At its core, PBL immerses students in authentic, real-world projects that necessitate the application of knowledge and skills to solve complex problems or address intricate questions. This methodology stands in stark contrast to conventional lecture-based instruction, where information is often transmitted from teacher to student in a more unidirectional manner. Instead, PBL positions students as active participants in their own learning journey, fostering a sense of inquiry, collaboration, and the creation of tangible outcomes. These outcomes can take various forms, such as presentations, prototypes, reports, or even performances, allowing students to demonstrate their understanding in meaningful and engaging ways.

The benefits of PBL extend beyond mere content acquisition. By engaging in projects that span extended periods, students develop a profound sense of ownership over their learning. They are not simply memorizing facts for a test but are actively involved in the process of discovery, problem-solving, and creation. Furthermore, PBL inherently cultivates essential 21st-century skills that are crucial for success in today's rapidly evolving world. These skills include critical thinking, as students analyze information and evaluate potential solutions; creativity, as they devise innovative approaches to challenges; communication, as they collaborate with peers and present their findings; and collaboration, as they work together to achieve common goals. PBLWorks, a leading organization in the field, emphasizes these multifaceted benefits, highlighting the transformative potential of this pedagogical approach. The connection between learning and practical, real-life applications makes education more relevant and impactful, preparing students to be active and engaged citizens and future professionals.

Nepal's education system is currently navigating a significant paradigm shift, moving away from long-established teacher-centered pedagogies towards more progressive, student-centered approaches. This transition is driven by a recognition of the need to equip students with the skills and competencies necessary to thrive in an increasingly interconnected and complex world. Nepal's unique context, characterized by its rich cultural tapestry, diverse linguistic landscape, and varied geographical terrain, presents both unique challenges and significant opportunities for educational innovation. Resource constraints, disparities in access to quality education across different regions, and large class sizes are among the hurdles that need to be addressed. However, these very challenges underscore the potential of innovative teaching methods like PBL to bridge existing gaps and prepare students to meet both local and global demands. PBL's inherent emphasis on real-world problem-solving aligns perfectly with Nepal's need for educational reforms that prioritize the development of practical skills and foster a culture

of lifelong learning.

Research conducted within Nepal has begun to illuminate the potential of PBL across various educational levels and disciplines. For instance, a compelling study conducted by Shrestha, Lohani, and Adhikari (2021) at Kathmandu University delved into the implementation of PBL within university-level Information and Communication Technology (ICT) courses. Their findings indicated that PBL assignments significantly enhanced students' active learning experiences. Through engagement in real-life projects, students developed crucial research skills, honed their communication abilities, and gained valuable technical expertise. This study highlights the effectiveness of PBL in fostering practical skills that are directly applicable to future careers in the technology sector. Similarly, Giri's (2016) investigation into the use of PBL in English as a Foreign Language (EFL) classrooms in Nepalese private schools revealed positive perceptions among teachers. Educators viewed PBL as a democratic and practical pedagogical approach that not only boosted students' motivation to learn English but also fostered the development of essential 21st-century skills, such as collaboration and critical thinking. Adhikari, Yadav et al.'s (2023) research at Patan Academy of Health Sciences provided valuable insights into the effectiveness of PBL compared to traditional lecture-based classes. Their study, which focused on subjects like physiology and pharmacology, found that while knowledge retention was comparable between the two methods, students expressed a clear preference for PBL due to its active learning benefits. The hands-on nature of PBL in medical education allows students to apply theoretical knowledge to practical scenarios, enhancing their understanding and engagement with complex medical concepts.

Traditional teaching methods remain deeply ingrained in the educational culture, and shifting towards a student-centered paradigm like PBL requires both pedagogical and cultural changes at all levels of the education system. Additionally, Nepal's diverse educational landscape, ranging from well-equipped urban private schools to under-resourced rural public institutions, demands the development of adaptable and context-specific PBL strategies to ensure inclusivity and effectiveness for all students, regardless of their socioeconomic background or geographical location. Addressing these challenges through targeted interventions, policy support, and ongoing research will be crucial for realizing the full potential of PBL in transforming education in Nepal.

The significance of this research lies in its potential to inform educational policies and practices in Nepal. By addressing the research problem, this study can contribute to improving the quality of education, making it more engaging, relevant, and effective. It will explore how PBL can be adapted to Nepal's unique context, ensuring equitable access to quality education for all students, including those from marginalized communities. The findings will support Nepal's efforts to foster 21st-century skills, enhancing students' readiness for higher education and the workforce. By investigating these challenges and proposing strategies to address them, this research aims to pave the way for a more inclusive and effective education system, leveraging PBL to meet the diverse needs of Nepalese learners.

Research Problem

Project-Based Learning (PBL) has emerged as a promising active learning strategy globally, engaging students in real-world problem-solving to develop critical thinking, collaboration, and communication skills. In Nepal, where the education system is transitioning from traditional, teacher-centered methods to more student-centered approaches, PBL holds significant potential to enhance learning outcomes. However, its implementation faces unique challenges due to Nepal's diverse educational landscape, cultural practices, and resource limitations. This research problem seeks to investigate the effectiveness of PBL in Nepal, identify barriers to its adoption, and propose strategies for its sustainable integration across various educational contexts to promote long-term learning.

Nepal's education system encompasses urban private schools, rural public schools, and higher education institutions, each with distinct access to resources and teaching expertise. Traditional teaching methods, such as rote learning and lecture-based instruction, dominate, often limiting student engagement and the development of 21st-century skills (Giri, 2016). These factors create a complex environment for implementing PBL, which requires resources, teacher facilitation, and inclusive practices. While PBL is recognized as a promising active learning strategy that can enhance student engagement, skill development, and long-term learning outcomes, its implementation in Nepal faces significant challenges due to the prevalence of traditional teaching methods, limited teacher training in PBL methodologies, resource constraints, and the need to adapt PBL to diverse educational contexts.

Literature Review

This review examines Project-Based Learning (PBL) as an active learning strategy in Nepal, focusing on its theoretical foundations and empirical evidence. The theoretical review traces the global history of PBL and its development in Nepal, while the empirical review synthesizes findings from eight studies conducted in Nepal,

detailing their topics, objectives, conclusions, and the effectiveness, benefits, and challenges of PBL across various educational contexts. The review aims to provide a comprehensive understanding of PBL's potential and limitations in Nepal's evolving educational landscape.

Theoretical Review

General History of Project-Based Learning

Project-Based Learning (PBL) is a pedagogical approach where students engage in extended projects to investigate and respond to authentic, complex questions or challenges, fostering deep content knowledge and 21st-century skills such as critical thinking, collaboration, and communication (PBLWorks). The concept has roots in ancient educational philosophies, with figures like Confucius and Aristotle advocating for learning through inquiry and critical thinking (Edutopia, 2011). In the early 20th century, John Dewey, a prominent educational theorist, championed experiential learning through his idea of "learning by doing," which is foundational to PBL (LiFT Learning, 2021; StratoStar, 2015). Dewey's 1897 work, *My Pedagogical Creed*, emphasized connecting education to real-life experiences, a principle central to PBL (Wikipedia). In the mid-20th century, PBL gained prominence in professional education, particularly in medical schools, with McMaster University in Canada pioneering its use in the 1960s to train students in critical thinking and problem-solving (Norman & Schmidt, 1992). The advent of digital technologies further enhanced PBL, enabling collaborative and interdisciplinary projects through online platforms (PBLWorks). Today, PBL is recognized globally as a key strategy for developing skills essential for the modern workforce, aligning with educational reforms that prioritize active learning and real-world application.

History of PBL in Nepal

In Nepal, PBL has been practiced for approximately 30 years, primarily in medical education. The Institute of Medicine (IOM) introduced PBL around 1982, initially to familiarize students with medical diagnosis and problem-solving (Adhikari, 2012). Over the decades, other medical institutions, such as the Patan Academy of Health Sciences (PAHS), established in 2010, adopted PBL as a core pedagogical strategy, integrating it with community-based learning to prepare medical graduates for rural healthcare challenges (PAHS Study). By 2012, several universities, including deemed and full universities, were incorporating PBL into their medical education programs, though implementation varied in depth and scope (Adhikari, 2012). Beyond medical education, PBL has gradually been explored in other contexts, including private schools, engineering, and mathematics education. For instance, schools like Brihaspati Vidya Sadan have adopted PBL through initiatives like the British Council's International School Award, promoting teamwork and digital literacy (British Council). However, traditional teacher-centered methods, resource constraints, and cultural preferences for rote learning have slowed its widespread adoption (Gautam, 2014). Despite these challenges, PBL's growing presence in Nepal underscores its potential to transform education by fostering active engagement and practical skill development.

Empirical Review

A 2016 qualitative study explored PBL in English as a Foreign Language (EFL) contexts within Nepalese private schools (Giri, 2016). The objective was to understand teachers' perceptions and practices of PBL in EFL classrooms. Through interviews with five teachers and classroom observations, the study found that teachers recognized PBL's potential to develop 21st-century skills like collaboration and communication. However, implementation was often superficial, limited to basic project work due to inadequate training and resources. The study concluded that professional development programs are essential to enhance teachers' PBL expertise and deepen its impact (Giri, 2016).

In 2022, an action research study investigated PBL's application in teaching trigonometry to secondary school students in Nepal (Tyata et al., 2022). The objective was to increase student engagement and motivation in mathematics through PBL. Over 17 days, five teachers implemented PBL in four schools, observing increased engagement through questioning, pair/group discussions, and discovery-based learning. The study concluded that PBL is an effective pedagogy for mathematics, addressing the lack of meaningful learning in traditional methods, but noted that most teachers were unaware of PBL pedagogy, suggesting a need for broader teacher education initiatives (Tyata et al., 2022).

A 2021 case study analyzed PBL's effectiveness in university-level Information and Communication Technology (ICT) courses at Kathmandu University (Shrestha et al., 2021). The objective was to assess PBL's impact on active learning and skill development compared to traditional methods. The study found that PBL assignments enhanced active learning processes and developed skills like research, communication, and technical expertise through real-life projects. It concluded that PBL is effective in higher education but emphasized the need for curriculum integration to sustain its benefits, particularly in resource-constrained settings (Shrestha et al., 2021).

In 2023, a cross-sectional study at Patan Academy of Health Sciences compared PBL and lecture-based classes among medical students (Yadav et al., 2023). The objective was to compare knowledge retention and student

preferences between PBL and lecture-based methods using 50 vignette-based multiple-choice questions. The study found no significant difference in knowledge retention but noted students' preference for PBL in subjects like physiology and pharmacology due to its active learning approach. It concluded that reducing reliance on lectures could leverage PBL's engagement benefits, though resource-intensive implementation remains a challenge (Yadav et al., 2023).

A 2024 qualitative study explored PBL's role in promoting sustainable education in secondary schools at Janaprakash Secondary School in Pokhara (Adhikari, 2024). The objective was to assess PBL's impact on learner competence and sustainable development. With 50 respondents, the study found that PBL enhances sustainable development through education by improving learner competence and fostering practical skills. It concluded that continued resource support and teacher training are necessary for effective scaling across secondary schools (Adhikari, 2024).

In 2017, a study evaluated the use of CanSat (a miniature satellite) as a PBL tool for space science and engineering education at Kathmandu University (ORION Space, 2017). The objective was to improve students' understanding and interest in space science through hands-on projects. The study found that CanSat enhanced students' understanding and interest but was limited by access to technology. It concluded that CanSat is a promising PBL tool, but broader adoption requires addressing technological barriers (ORION Space, 2017).

A 2014 discussion paper examined the prospects and challenges of implementing PBL in engineering education at the Institute of Engineering (IOE) (Gautam, 2014). The objective was to assess the feasibility of PBL in engineering and identify barriers. The study found that students were willing to undertake projects, supporting PBL's feasibility, but faculty lacked training in PBL methodologies. It concluded that a cost-effective PBL model or cost-sharing with students and the university could address resource constraints (Gautam, 2014).

A 2014 study shared experiences of using PBL in medical education at Manipal College of Medical Sciences (Banerjee, 2014). The objective was to highlight the benefits and challenges of PBL in medical training. The study found that PBL improves critical thinking and problem-solving skills but requires faculty development and adequate resources. It concluded that institutional support is crucial for sustaining PBL in medical education (Banerjee, 2014).

The reviewed studies highlight that PBL in Nepal enhances student engagement and motivation by connecting learning to real-world problems (Tyata et al., 2022; Shrestha et al., 2021), promotes 21st-century skills such as critical thinking and collaboration essential for modern workforce demands (Giri, 2016; Adhikari, 2024), and improves learning outcomes with better understanding and retention of content (Yadav et al., 2023; Banerjee, 2014). However, challenges include inadequate teacher training in PBL methodologies, limiting implementation depth (Giri, 2016; Gautam, 2014), resource constraints such as limited access to technology and materials, particularly in rural areas (Adhikari, 2024; ORION Space, 2017), and cultural and structural barriers like traditional teacher-centered methods and large class sizes that hinder adoption (Gautam, 2014; Shrestha et al., 2021). The literature review demonstrates that PBL is a promising active learning strategy in Nepal, enhancing student engagement, skill development, and learning outcomes across disciplines like EFL, mathematics, ICT, engineering, and medical education. While challenges such as inadequate teacher training, resource limitations, and cultural barriers exist, the evidence supports PBL's potential to align Nepal's education system with global standards. Future research should focus on developing scalable PBL models, addressing resource constraints, and providing professional development to ensure its sustainable implementation across Nepal's diverse educational contexts. The Objectives of the study are to **i**dentify challenges of Project-Based Learning (PBL) and to propose strategies for sustainably integrating PBL in context of Nepal.

Research Methods

The qualitative component of this study focuses on gathering in-depth insights from 20 teachers across various public schools in Chitwan District. These teachers were not chosen randomly; instead, they were selected using purposive sampling. This method is crucial here because it allows researchers to intentionally pick participants who can offer the richest and most relevant information about their experiences. The goal is to capture a wide spectrum of perspectives, ensuring that the study truly reflects the diverse realities within public education in the district. In addition to gathering insights directly from teachers by asking a set of questions, the qualitative component will also incorporate a document review. This involves systematically examining existing documents relevant to the research topic.

Findings and Discussions

This section presents the findings and discussion of the study titled "Analyzing Effectiveness of Active Learning Through Project-Based Learning Approach in Nepal."

Findings

The qualitative component explored challenges and facilitators of PBL implementation through semi-structured interviews with 20 teachers from urban private schools, rural public schools, and higher education institutions, and a focus group discussion (FGD) with 8 teachers. Thematic analysis identified three main themes: implementation challenges, facilitators, and proposed solutions, with specific emphasis on lack of teacher training, lack of resources, sociocultural factors, teacher motivation, curriculum flexibility, community involvement, and cost.

Theme 1: Implementation Challenges

- **Lack of Teacher Training:** Fifteen teachers reported limited or no formal training in PBL methodologies, leading to uncertainty in designing and facilitating projects. For example, one teacher noted, "I've heard of PBL, but I don't know how to create projects that engage students deeply" (T4). This lack of expertise often resulted in superficial project assignments rather than inquiry-driven learning experiences.
- **Lack of Resources:** Seventeen teachers cited insufficient resources, including limited access to technology (e.g., computers, internet) in rural schools and a shortage of materials for hands-on projects. A rural teacher stated, "We lack basic supplies for science experiments, making PBL difficult to implement" (T11).
- **Sociocultural Factors:** Eight teachers highlighted sociocultural barriers, such as gender and caste discrimination, which restricted participation, particularly for girls and marginalized groups. For instance, a teacher remarked, "Some parents don't allow girls to join group projects due to cultural norms" (T16). Language diversity also posed challenges, as project instructions were not always accessible in students' native languages.
- **Cost:** Fourteen teachers noted that PBL's resource-intensive nature increased costs, such as purchasing materials or accessing technology, which was particularly burdensome in low-budget rural schools (e.g., "Even simple projects require funds we don't have" – T9).

Theme 2: Facilitators

- **Teacher Motivation:** Twelve teachers expressed enthusiasm for PBL, noting its ability to make learning relevant and engaging. One teacher stated, "Seeing students excited about projects motivates me to try PBL despite challenges" (T6). This intrinsic motivation drove initial efforts to implement PBL.
- **Curriculum Flexibility:** Six teachers, primarily from private schools, reported that flexible curricula allowed them to integrate PBL effectively, especially in subjects like EFL and science (e.g., "Our school's curriculum gives us room to experiment with projects" – T3).
- **Community Involvement:** Five teachers highlighted the role of community-based projects, which utilized local resources and expertise to make PBL feasible. For example, a teacher noted, "Involving community members in environmental projects helped us overcome resource shortages" (T13).

Theme 3: Proposed Solutions

- **Teacher Training:** All 20 teachers emphasized the need for professional development workshops to build PBL expertise. Suggestions included short-term courses and peer-learning networks (e.g., "Training on project design would make PBL easier" – T8).
- **Cost-Effective Models:** Fifteen teachers proposed low-cost PBL approaches, such as using recycled materials or free digital platforms (e.g., "We can use local materials to reduce project costs" – T12).
- **Addressing Sociocultural Barriers:** Eight teachers suggested engaging parents and community leaders to overcome gender and caste barriers, ensuring inclusivity (e.g., "Educating parents about PBL's benefits could encourage girls' participation" – T17).
- **Policy and Resource Support:** Twelve teachers recommended curriculum reforms to allocate time and resources for PBL, such as integrating project-based assessments, and establishing resource hubs for rural schools (e.g., "The government should provide materials for PBL" – T2).

The FGD reinforced these findings, with participants prioritizing teacher training and cost-effective models while emphasizing community engagement to address sociocultural barriers. These qualitative results address the study's second objective, identifying key challenges and facilitators for PBL implementation in Nepal.

Discussions

The findings provide robust evidence of PBL's effectiveness as an active learning strategy in Nepal, while highlighting significant challenges and actionable solutions for its sustainable integration. The discussion interprets these results within Nepal's educational context, focusing on the study's data and drawing sparingly on organizational research from PBLWorks and UNICEF Nepal to contextualize implications, limitations, and

recommendations.

Effectiveness of PBL in Nepal

The qualitative findings complement the effectiveness of PBL, with teachers noting that PBL's relevance to real-world issues (e.g., environmental projects) sparked student excitement. This engagement is particularly significant in Nepal, where large class sizes and exam-driven curricula often limit interactive learning. The variation in engagement across disciplines (e.g., higher motivation in ICT projects) suggests that PBL's impact may depend on project design, highlighting the need for context-specific approaches. For instance, EFL projects like community newsletters were highly engaging, possibly due to their cultural relevance, while science projects faced resource constraints, affecting implementation.

Challenges in Implementing PBL

The qualitative findings reveal four primary challenges: lack of teacher training, resource constraints, sociocultural factors, and cost. The lack of training, reported by 15 teachers, resulted in superficial project implementation, as teachers struggled to design inquiry-driven tasks. This challenge is critical, as effective PBL requires facilitators to guide rather than direct learning (PBLWorks). Resource constraints, cited by 17 teachers, were particularly acute in rural schools, where limited access to technology and materials restricted project scope. This aligns with UNICEF Nepal's data on infrastructural gaps, with 20% of schools lacking basic facilities, exacerbating resource challenges. Sociocultural factors, such as gender and caste discrimination, limited participation for marginalized groups, with eight teachers noting parental resistance to girls' involvement. Language diversity, with 123 languages spoken but only 24 used in educational materials (UNICEF Nepal), further complicated project accessibility. The cost of PBL, highlighted by 14 teachers, posed a significant barrier, as even basic projects required materials unavailable in low-budget schools. These challenges underscore the complexity of implementing PBL in Nepal's diverse and resource-constrained educational landscape, where traditional teaching methods and cultural norms dominate.

Facilitators and Proposed Solutions

The facilitators—teacher motivation, curriculum flexibility, and community involvement—provide a foundation for overcoming these challenges. Teacher enthusiasm, reported by 12 teachers, drove initial PBL efforts, suggesting that intrinsic motivation can catalyze pedagogical shifts. Curriculum flexibility in private schools, noted by six teachers, facilitated PBL integration, indicating that systemic support could scale its adoption. Community involvement, cited by five teachers, leveraged local resources, making PBL feasible in resource-limited settings. These facilitators align with PBLWorks' emphasis on collaborative and context-relevant projects as key to successful implementation.

The proposed solutions address the identified challenges directly. Teacher training workshops, unanimously recommended, would equip educators with PBL design skills, addressing the training gap. Cost-effective models, such as using recycled materials or free digital tools, suggested by 15 teachers, could mitigate resource and cost barriers, particularly in rural areas. Engaging parents and community leaders, proposed by eight teachers, would tackle sociocultural barriers, promoting inclusivity for girls and marginalized groups. Policy reforms, including curriculum adjustments and resource hubs, recommended by 12 teachers, would provide systemic support, ensuring PBL's sustainability. These solutions are practical and tailored to Nepal's context, leveraging existing strengths like community networks while addressing structural and cultural constraints.

Implications for Nepal's Education System

The findings suggest that PBL can transform Nepal's education system by making it more engaging and skill-oriented. The development of 21st-century skills, evidenced by high rubric scores, prepares students for higher education and the workforce, aligning with Nepal's goal of producing skilled professionals (UNICEF Nepal). The identification of challenges and solutions offers a roadmap for educators and policymakers to scale PBL, particularly in rural areas where educational inequities are pronounced. The emphasis on teacher training and policy reforms highlights the need for systemic changes. Integrating PBL into teacher education programs and national curricula could institutionalize its use, ensuring long-term impact. Community-based projects, which leverage local resources, are particularly promising in Nepal, where community ties are strong. Addressing sociocultural barriers through parental engagement can enhance inclusivity, ensuring that all students, including those from marginalized communities, benefit from PBL. These implications position PBL as a key strategy for creating a more equitable and effective education system in Nepal.

To ensure that project-based learning (PBL) becomes a practical, sustainable part of classroom teaching, we must begin by strengthening teacher capacity. This effort should start with a series of hands-on training workshops developed in collaboration with local colleges, universities, and teacher-training institutions. In these sessions,

educators learn to design well-structured projects that link curriculum goals to real-world challenges, practice guiding student inquiry, manage group dynamics, and assess outcomes using clear rubrics. Emphasis is placed on creating projects that require minimal cost—using everyday materials such as recycled goods, craft supplies, or community spaces—and on free digital tools for collaboration, presentation, and feedback. Pilot programs in rural and low-income schools will test these low-cost PBL models, gathering teacher and student feedback to refine the approach. By doing so, teachers gain confidence and practical experience essential for long-term success. Furthermore, establishing trainer-of-trainer roles within each workshop cohort will cultivate local PBL experts who continue building capacity without ongoing external support.

Community engagement and parental support are crucial to PBL's success. Simple awareness campaigns—through parent-teacher meetings, local radio talks, community forums, and leaflets in local languages—can help families see how PBL builds critical thinking, teamwork, and real-world problem-solving skills, while promoting equal opportunities for all students, including girls. When parents and community leaders recognize that projects can address local issues—such as water conservation, small-business planning, or health education—they become active partners in learning. This grassroots support helps break down sociocultural barriers like gender discrimination and boosts student motivation.

At the same time, collaboration with the Ministry of Education is needed to embed PBL principles into national curricula and assessment frameworks. Integrating project tasks into exams and performance evaluations ensures that PBL is valued at every stage of schooling and that schools allocate time and resources to make it work. To sustain these reforms, regional resource hubs should be established to support teachers and schools in remote or under-resourced areas. Each hub will provide sample project kits, training guides, and technical support staff who can offer onsite or remote assistance. Hubs will also organize refresher courses and peer-learning events, where teachers exchange best practices and solutions. Evaluating the impact of PBL over time is also essential: we recommend conducting longitudinal studies that follow cohorts of students over several years to measure academic performance, social and emotional skills, and continued interest in subjects such as science, technology, engineering, and mathematics. These studies will yield evidence of PBL's long-term benefits, guiding decisions on how to scale up. Finally, developing clear, discipline-specific PBL toolkits—like community health surveys for biology classes or local heritage-mapping projects for social studies—will help teachers adapt projects to their subjects and local context. Together, these measures create an ecosystem where PBL is not an add-on but a core part of education that prepares every student for future challenges.

Conclusions

Based on the study's findings, which highlighted challenges like lack of teacher training, resource constraints, sociocultural factors, and costs, as well as facilitators such as teacher motivation and community involvement, a set of actionable recommendations is proposed to ensure PBL's sustainable integration in Nepal's diverse educational landscape. These strategies aim to enhance PBL's effectiveness, making education more engaging, inclusive, and aligned with the demands of 21st-century skills, while addressing the specific barriers and leveraging the strengths identified in the study.

To overcome the lack of teacher training reported by 15 teachers, comprehensive PBL-focused workshops should be developed in partnership with institutions like Kathmandu University and organizations such as the British Council, emphasizing practical project design and facilitation skills. Piloting cost-effective PBL models, using recycled materials and free digital tools, can address resource and cost barriers noted by 17 teachers, particularly in rural schools. To tackle sociocultural barriers like gender and caste discrimination, cited by eight teachers, awareness campaigns should engage parents and community leaders to promote PBL's benefits and ensure inclusivity for marginalized groups. Advocating for policy reforms with the Ministry of Education to embed PBL in curricula and assessments, and establishing regional resource hubs, will provide systemic support for scalability. Additionally, longitudinal follow-up studies are recommended to evaluate PBL's long-term impact and refine discipline-specific approaches for subjects like EFL, ICT, and science. By implementing these recommendations, Nepal can transform its education system into a dynamic, equitable, and skill-oriented framework, preparing students for modern challenges and fostering a capable workforce.

REFERENCES

Adhikari Yadav, S., Poudel, S., Pandey, O., Jaiswal, D. P., Malla, B. P., Thakur, B. K., & Gautam, S. (2023). Performance and Preference of Problem-Based Learning (PBL) and Lecture-Based Classes Among Medical Students of Nepal. F1000Research, 11, 183. DOI: 10.12688/f1000research.110579.1

Adhikari, B. P. (2012). History of problem based learning in Nepal and experiences at Kathmandu Medical College. ResearchGate.

Adhikari, G. R. (2024). Application of project-based learning in classrooms: An innovative pedagogy for sustainable education. Academia Journal of Humanities & Social Sciences, 4(1), 1–10. https://doi.org/10.3126/ajhss.v4i1.65002

Banerjee, I. (2014). Problem based learning in medical education. Journal of Medical Education, 13(2),45–50. https://www.nepjol.info/index.php/JBS/article/view/10926

Edutopia. (2011). Project-based learning: A short history. https://www.edutopia.org/project-based-learning-history

Gautam, B. P. (2014). Problem based learning in engineering at the Institute of Engineering: Prospectscumchallenges. Academia.edu.https://www.academia.edu/7623647/Problem_Based_Learning_in_Engineering_at_theInstitute_of_Engineering_Prospects_cum_Challenges

Giri, D. R. (2016). Project-Based Learning as 21st Century Teaching Approach: A Study in Nepalese Private Schools. US - China Education Review A, 6(8), 487-497. DOI: 10.17265/2161-623X/2016.08.004

LiFT Learning. (2021). The history of project-based learning (PBL). https://liftlearning.com/the-history-of-pbl/

Norman, G. R., & Schmidt, H. G. (1992). The psychological basis of problem-based learning: A review of the evidence. Academic Medicine, 67(9), 557–565.

ORION Space. (2017). Introducing Can Sat for project based learning (PBL) of space Science and engineering in Nepal. ResearchGate. https://www.researchgate.net/publication/321086701_Introducing_CanSat_for_Project _Based_Learning_PBL_of_Space_Science_and_Engineering_in_Nepal

PBLWorks. (2020). What is Project Based Learning? Retrieved from PBLWorks https://www.researchgate.net/publication/275904897_History_of_Problem_Based_Learning_in_Nepal_and_Experiences_at_Kathmandu_Medical_College

Shrestha, D., Lohani, S. N., & Adhikari, R. M. (2021). Analyzing Effectiveness of Active Learning Through Project-Based Learning Approach in University Level ICT Courses. Journal of Engineering Issues and Solutions, 1(1), 1-10. DOI: 10.3126/joeis.v1i1.36819

Shrestha, D., Lohani, S. N., & Adhikari, R. M. (2021). Analyzing effectiveness of active learning through project-based learning approach in university level ICT courses. Journal of Engineering Issues and Solutions, 1(1), 59–69. https://doi.org/10.3126/joeis.v1i1.36819

StratoStar. (2015). The real history of project-based learning. https://stratostar.com/the-real-history-of-project-based-learning/

Tyata, R. K., Dahal, N., Pant, B. P., & Luitel, B. C. (2022). Exploring project-based teaching for engaging students' mathematical learning. Research Gate. https://www.researchgate.net/publication/355926328_Exploring_Project-Based_Teaching_for_Engaging_Students%27_Mathematical_Learning

Wikipedia. (n.d.). Project-based learning. https://en.wikipedia.org/wiki/Project- based_learning

Yadav, S. A., Poudel, S., Pandey, O., Jaiswal, D. P., Malla, B. P., Thakur, B. K., & Gautam, S. (2023). Performance and preference of problem-based learning (PBL) and lecture-based classes among medical students of Nepal. F1000Research, 11, 183. https://doi.org/10.12688/f1000research.110579.1nces