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Beyond the Classroom: Examining the Influence of Project-Based Learning on Student Development

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Abstract

Project-Based Learning (PBL) is widely acknowledged as a transformative educational methodology that bridges the gap between conventional education and the demands of a knowledge-based, dynamic labour market. This study experimentally investigates the influence of PBL on student growth through a comprehensive survey of 229 undergraduate students from Patiala, Punjab. The results indicate that 68.6% of students find PBL more interesting than conventional approaches, with substantial majorities reporting notable improvements in teamwork (77.7%), problem-solving (73.8%), and critical thinking (69.4%). Moreover, 88.2% of respondents assert that PBL adequately prepares students for future employment, while 79.9% strongly concur that it improves real-world problem-solving skills. Nonetheless, significant obstacles persist, including the "absence of guidance from instructors" (45%) and "effective time management" (41.5%), indicating deficiencies in project management and facilitation. Students demonstrate a strong inclination toward genuine, industry-oriented projects and advocate for increased opportunities for project-based learning (97.4%). These findings affirm PBL as an essential component of comprehensive student development and job readiness, while underscoring the need for enhanced instructor training, project management support, and resource availability. This research guides educational reform by promoting the systematic incorporation of robust, real-world project-based learning across the curriculum.

Keywords: *Project-Based Learning (PBL*), *Student development, 21st-century skills, Educational reform, Career readiness*

1. Introduction

The twenty-first century has introduced unparalleled transformations in employment, society, and global communication, necessitating educational institutions to redefine the competencies students must attain to succeed in a knowledge-based, digitally interconnected environment. The World Economic Forum's 2023 research on future work trends indicates that by 2027, over 50% of the workforce would require reskilling, with critical thinking, issue definition and resolution, creativity, and collaborative work identified as the foremost essential skills [1]. The transition to innovation-driven economies has challenged traditional educational paradigms of rote memorisation and static information transmission, since they fail to adequately prepare learners for participation in the global workforce [2]. The incongruence between traditional education and the requirements of a contemporary, dynamic environment has instigated a global transformation in educational paradigms. Academics and governments are increasingly endorsing educational methodologies that prioritise active learning, autonomy, and experiential engagement [3]. The Organisation for Economic Co-operation and Development (OECD) has recognised learner autonomy, contextualised problem-solving, and lifelong learning as essential components for the future of education. In light of the necessity, educational methods

that promote student-centred, inquiry-based, and experiential learning are increasingly gaining prominence globally. Project-Based Learning (PBL) has emerged as a very effective model, aligning with the educational objectives of the 21st century. Educational institutions persist in employing dominant instructional approaches derived from a classical pedagogical heritage characterised by passive information absorption, inflexible curricular frameworks, and one-dimensional assessment of accomplishment. Although efficient for mass instruction and fulfilling curricular requirements, this method often fails to develop students' capacity for critical and collaborative application of knowledge. Research increasingly suggests that these pedagogical strategies are not only engaging but also inadequate in fostering long-term memory retention, cognitive flexibility, or the transfer of learning across different contexts [4]. In a conventional classroom environment, the educator holds exclusive power, while the students act as passive recipients. Assessment systems may prioritise the recollection of facts above the synthesis of information, originality of thinking, or the application of knowledge, favouring shallow understanding instead of profound learning. Moreover, several studies indicate that student involvement with school markedly diminishes as they go through the educational system. The Gallup Education Report (2019) suggests that student engagement declines by 30% from elementary to high school, correlating with a decrease in academic performance and motivation [5].

Numerous companies frequently express concerns about graduates' readiness, especially regarding teamwork, ethical reasoning, communication, and adaptability, skills that are often lacking in teacher-centred educational settings. Project-Based Learning is a comprehensive instructional method in which students gain knowledge and skills by collaborating over an extended period to address and resolve complex, significant problems or questions. The project is the primary organisational framework around which all learning objectives are focused, rather than merely serving as an ancillary or closing activity. The Buck Institute for Education outlines specific characteristics of effective Project-Based Learning (PBL), encompassing a compelling issue, ongoing research, authentic contexts, student autonomy, iterative refinement through critique and reflection, and a publicly presented outcome [6]. The educational literature on PBL enumerates numerous purported advantages of its implementation. Research indicates that Project-Based Learning enhances profound conceptual comprehension, increases intrinsic motivation, and fosters collaborative and metacognitive skills. Students engaged in project-based learning (PBL) appear to exhibit increased enthusiasm, improved attitudes toward learning, and advancements in STEM and humanities disciplines. Additionally, PBL scenarios often enable students to navigate uncertainty and resolve disagreements, demonstrating leadership skills highly sought after in contemporary businesses [7]. Despite its expanded use, PBL remains a topic of intense scholarly debate and practical difficulty.

The inconsistent empirical findings on its impact on average academic success are a persistent issue in the literature. While some meta-analyses find that the effect depends on various contextual factors, including curriculum alignment, teacher quality, and institutional support, other publications reveal minor improvements in student accomplishment. This discrepancy highlights the ineffectiveness of PBL studies, particularly in terms of measurable academic progress. Beyond issues of efficacy, there is still an execution gap. Transitioning from conventional teaching methods to Project-Based Learning necessitates fundamentally

restructuring classroom management practices, assessment techniques, and instructional design. Project-based learning will likely disadvantage marginalised group members and benefit students with preexisting cultural and intellectual capital if not addressed through inclusion and equity initiatives. In many schools, where rigid curriculum templates limit pedagogical flexibility, conventional theoretical learning often predominates despite its benefits. This necessitates a paradigm shift in teaching strategies, emphasising collaboration, creativity, and inquiry over passive information absorption. To determine the actual impact of PBL on student development, this study employs a survey-based analysis, with participants drawn from a diverse range of regional colleges and institutions.

Regarding projects completed in academic classrooms, the study examines students' attitudes, experiences, and outcomes. The results, presented through visual aids such as pie charts, provide insight into how PBL contributes to professional and personal growth, as well as academic achievement. Growing evidence supporting PBL's effectiveness in integrating academic learning with real-world readiness underscores the urgency of transforming education. Project-Based Learning (PBL) provides students with real-world assignments that enhance their communication, teamwork, and self-management skills, which are often not acquired in a traditional classroom setting.

The structure of the paper is as follows. Section 2 summarises the literature on Project-Based Learning, tracking the theoretical underpinnings, development, and empirical results across diverse fields. Section 3 describes the research design, including the rationale supporting the case study choice, the data gathering processes, and the analytical frameworks utilised. Section 4 presents the results from chosen case studies with a selective focus on typical enabling circumstances and hindrances. In Section 5, conclusions with a basis for practice are followed by theoretical contributions and directions for subsequent scholarship.

2. Literature Review

The need for flexibility, analysis, and collaboration, which are crucial in modern economies, is causing a paradigm change in education in the twenty-first century. In this way, Project-Based Learning (PBL) has emerged as a notable teaching paradigm that enhances cognitive engagement and integrates real-world problems into the teaching and learning process. By assessing theoretical foundations, design principles, teaching results, comparative efficacy, implementation obstacles, equity concerns, evaluation systems, and future directions, the current literature review on PBL, as shown in Table 1, synthesises the existing body of scholarship on the subject. According to Dewey et al. [8], education should be experience-based, allowing students to gain knowledge by actively participating in global events. By encouraging students to actively participate in the information-discovery process, PBL supports knowledge building. By incorporating experiential learning theory into problem-based learning with a focus on reflective and active cycles, Kolb et al. [9] supported. According to Altan et al. [10], design-based learning, a subset of project-based learning (PBL), effectively fosters classroom iterative thinking and problem-solving skills through purposeful experimentation. An extensive meta-analysis by Zhang et al. [11] demonstrated that PBL enhances students' academic performance, critical thinking skills, and emotional engagement, particularly in engineering and technology. According to Baran et al. [12], the use of PBL in

STEM education significantly enhances students' problem-solving abilities, adaptability, and higher-level thinking, all of which are critical in today's classroom.

PBL fosters dynamic learning environments where students develop critical thinking, creativity, teamwork, and communication, essential elements of 21st-century competencies. particularly in scientific and STEAM subjects, according to Chistyakov et al. [13]. Building on this viewpoint, Rozan et al. [14] emphasised that project-based learning (PBL) helps vocational high schools develop life and career skills, showing that students who participate in PBL exhibit greater self-assurance, initiative, and preparedness for the workforce. PBL is associated with improving computational thinking, a crucial digital skill, as well as standard academic and life skills. According to a meta-analysis by Zhang et al. [15], PBL interventions significantly enhance students' computational thinking abilities across all subject areas and educational levels by promoting logical reasoning, algorithmic thinking, and problem decomposition. PBL further enhances motivation and engagement, two essential components of successful learning. According to Ash et al., students who engage in project-based learning and relevant, real-world learning experiences show increased intrinsic motivation and better readiness for future professional difficulties [16]. According to Ahmad et al. [17], their systematic review found that PBL enhances student enthusiasm and participation, especially in technical and vocational education contexts where hands-on experience is essential. According to Sarah et al. [18], children who participate in STEM-focused project-based learning demonstrate a 22% increase in academic achievement compared to their counterparts in conventional settings. According to Campos et al. [19], minority students' involvement in PBL was improved by community integration and representation in project settings. In project-based learning environments, neurodiverse learners may experience cognitive overload and disengagement if customised teaching strategies are not employed.

Additionally, another significant advantage of training conducted through Project-Based Learning (PBL) is the development of soft skills and interpersonal abilities, such as collaboration, communication, and teamwork. Dogara et al. [20] showed how PBL can connect cognitive knowledge with occupational needs and emphasised its value in helping vocational school students acquire soft skills. Academic success and student motivation have shown encouraging results when using Project-Based Learning (PBL) in scientific education. According to a recent extensive study by Suparmi et al. [21], PBL techniques enhance scientific instruction by fostering students' capacity for critical and creative thinking and their ability to collaborate in solving challenging problems. Aggarwal et al. [22] refer to this change as a "revolution of self-learning," contending that ubiquitous digital technology enables students to take charge of their education, which is a fundamental idea of PBL. They argue that the tools foster a culture of inquiry and self-discovery, rather than the conventional teacher-expert model. According to Kim et al.'s hypothesis [23], socioeconomic position may mitigate the benefits of Problem-Based Learning (PBL), since students from higher socioeconomic backgrounds are more likely to succeed due to their greater access to resources and experience with inquiry-based learning. Together, these studies demonstrate PBL's numerous advantages and attest to the effectiveness of a student-centred strategy that prepares students to tackle the challenging problems of the twenty-first century.

TABLE 1: Comparative Analysis of Recent Studies on Project-Based Learning

S No.	Year	Authors	Highlights
1.	2025	Kim et al. [23]	Emphasizes an increasing agreement among educators in South Korea on the significance of interdisciplinary project-based learning methodologies to improve ecological education.
2.	2025	Sarah et al. [18]	The design of assessments in problem-solving situations significantly influences student motivation and promotes deep learning strategies rather than superficial ones.
3.	2025	Aggarwal et al. [22]	Proponents of self-directed learning view it as a gradual departure from conventional teaching, consistent with the concepts of PBL.
4.	2024	Campos et al. [19]	Discovered that project-based learning markedly enhanced academic performance, conduct, and involvement among eighth-grade science students.
5.	2024	Suparmi et al. [21]	PBL enhances scientific education by fostering creativity, critical thinking, cooperation, and communication skills.
6.	2024	Rozan et al. [14]	Project-Based Learning cultivates essential life and career competencies in vocational high school students, therefore improving their preparedness for the workforce.
7.	2024	Zhang et al. [15]	PBL solutions markedly enhance students' computational thinking abilities across diverse educational tiers.
8.	2023	Zhang et al. [11]	PBL significantly improves academic achievement, affective attitudes, and thinking skills, especially in engineering and technology subjects.
9.	2023	Chistyakov et al. [13]	Project-Based Learning cultivates critical thinking, creativity, cooperation, and communication within STEAM education.
10.	2023	Ahmad et al. [17]	PBL augments motivation and engagement, particularly within technical and vocational education settings.
11.	2021	Baran et al. [12]	PBL-STEM applications enhance problem-solving abilities, flexibility, and 21st-century competencies in pupils.
12.	2021	Ash et al. [16]	Project-Based Learning enhances intrinsic motivation and equips students for real-world difficulties via genuine, experiential learning opportunities.
13.	2019	Dogara et al. [20]	Project-Based Learning cultivates interpersonal skills such as teamwork, communication, and problem-solving within vocational institutions.

The existing literature presents a robust global discourse on Project-Based Learning (PBL), emphasising its pedagogical benefits, outlining optimal implementation conditions, and addressing concerns related to equity and teacher readiness. Most existing studies are either qualitative case studies of a solitary institution or theoretical constructs with a Western education setting in mind. A significant gap exists in the comprehensive, quantitative studies that offer a comparative analysis of PBL implementation across various educational institutions in a specific non-Western context. We address this significant gap by quantitatively analysing PBL perceptions and practices across various educational institutions in Punjab, India. While universal principles of PBL are of great utility, implementation is significantly mediated by regional norms of culture, resource acceptability, curriculum requirements, and teacher preparation. Our study transcends generic constructs by systemically harvesting and comparing survey data from the given setting. It seeks to create a comparative framework empirically informed by the realities of the Punjabi education scene, providing specific information that is valuable in terms of actionable advice for the practical and equitable implementation of PBL, which is regionally relevant for educators and regional policymakers. The subsequent section describes a quantitative study that provides empirical information regarding learners' attitudes, preferences, and adoption of Project-Based Learning habits, as influenced by online forums, hybrid learning, and the incorporation of technology into educational architectures.

3. Quantitative Analysis

This research employed a quantitative methodology grounded in empirical data gathering and statistical analysis to comprehensively investigate the impact of Project-Based Learning (PBL) on student development. A comprehensive survey questionnaire was developed to assess students' exposure to PBL and its implications for academic advancement, critical thinking skills, collaboration, and overall personal growth. The researcher focused on undergraduate students from various academic disciplines in colleges and institutes in and around Patiala, Punjab, India. This study employs convenience sampling, a non-probability sampling method that facilitates straightforward empirical analysis. The current study primarily used a questionnaire to meet the data requirements. A survey questionnaire was developed and administered to students from several selected local institutions in Patiala, Punjab, India. The questionnaire's content validity was bolstered by expert evaluation from the Training and Development Cell. The comments were meticulously evaluated and compiled, confirming the appropriateness of the questionnaire for analysing self-learning practices and attitudes. The questionnaire's reliability was assessed using the Cronbach's alpha technique. The computed values for all questions in the survey varied from 0.77 to 0.8, indicating an adequate degree of reliability. The outcome demonstrates that the questionnaire yields a dependable evaluation of the specified factors, confirming the quality and reliability of the collected data. The dependability of the survey questionnaire, the replies elicited, and the interpretation of the collected data are crucial to this endeavour's advancement toward a quantitative analysis.

Although several educational theories advocate for experiential learning, few empirical studies examine students' attitudes, perceptions, and developmental outcomes related to Project-Based Learning (PBL). This study addresses the deficiency by providing evidence-based insights on

learner engagement with project-based learning, particularly in academic environments transitioning from traditional lecture-based instruction. This quantitative analysis examines students' perceptions of the importance of project-based activities for real-world skills, the influence of PBL on interdisciplinary understanding and critical thinking, and the extent to which students develop autonomy, collaboration, and communication skills. These findings are crucial for creating an educational system that emphasizes adaptability, self-reliance, and practical learning. Students from a reasonable number of different colleges and disciplines in Patiala, Punjab state, provided 229 replies for the study. Such demographic variety completely explains the influence of PBL and improves the dataset's representativeness. Significant conclusions drawn from datasets of comparable size have been corroborated by such research in the field of education. Further techniques to strengthen this dataset's statistical power in subsequent research include the use of margin of error estimates, cross-tabulations, and confidence intervals.

4. Results and Discussion

This section provides an in-depth examination of students' opinions and experiences regarding Project-Based Learning (PBL). Through a variety of pie charts and in-depth analysis, this section illustrates the diverse effects of PBL on pupils. The majority of students found Project-Based Learning (PBL) more engaging and significant than traditional teaching techniques, according to this study, which examines the impact of PBL on student engagement, conceptual understanding, and motivation. This section examines how PBL might help build critical abilities that are useful in the business, such as leadership, teamwork, communication, and time management. It also emphasizes the growth of creativity and invention by giving pupils the ability to think freely and discover original answers to challenging problems. The findings demonstrate how PBL links experience and theoretical knowledge, making knowledge learning applicable and valuable. In order to demonstrate the overall advantages of PBL, this research skillfully weaves a gripping story through the examination of each area. It emphasizes how crucial inquiry-centered, active learning is to the growth of critical thinking and problem-solving abilities. This section seeks to illustrate how Project-Based Learning (PBL) enhances academic achievement and fosters personal development that enables students to effectively navigate a variety of life challenges. Because they serve as the experiential basis for the students' perspectives, the respondents' demographic profile and past PBL experience provide a crucial basis for understanding the findings.

Figure 1 reveals that around 73.4% of students are somewhat familiar with Project-Based Learning (PBL), whereas 15.7% are highly familiar, and 10.9% are unfamiliar. This analysis demonstrates that although Project-Based Learning (PBL) is gaining prominence in educational settings, a substantial portion of the student population is either partially familiar with it or entirely unfamiliar. Initial assessments of student comprehension of PBL revealed a complex understanding of the instructional approach. This circumstance suggests that although PBL activities may be integrated into the learning framework, the student population does not universally possess a comprehensive and clear understanding of the theoretical foundations or the formative pedagogical model of PBL.

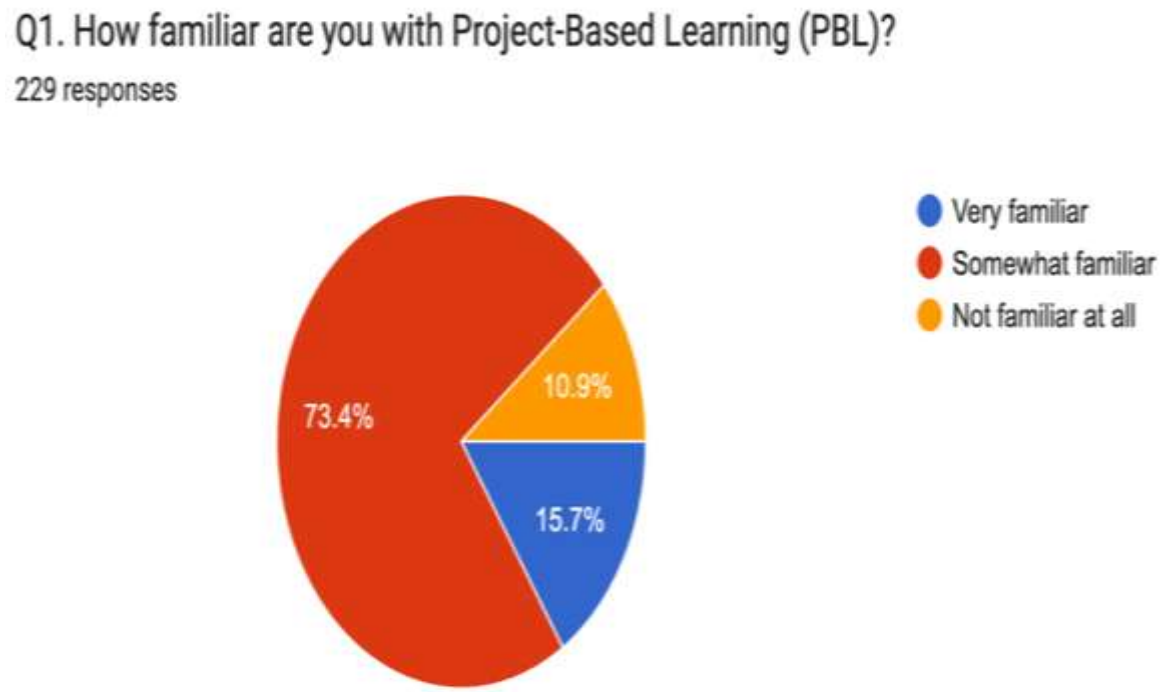

Figure 1: Respondents' familiarity with Project-Based Learning (PBL) (N = 229).

Further analysis of student participation in PBL experiences provides essential context. **Figure 2** demonstrates that 84.3% of students had previously engaged in a PBL experience, with 31.9% having done so "multiple times" and 52.4% "only once or twice." A smaller segment (15.7%) reported having "No, never" participated in PBL. Although familiarity with the term "PBL" is relatively widespread, consistent hands-on engagement with this methodology appears lacking. This gap between recognition and execution suggests either fragmented implementation or variability in curricular integration across institutions, which could limit students' ability to internalise the benefits associated with PBL. This high rate of prior engagement is a critical strength of the study, as it ensures that the subsequent feedback regarding engagement, skill development, challenges, and preferences is rooted in direct, practical experience rather than theoretical or abstract understanding. The substantial proportion of students with direct experience lends significant validity and practical relevance to the findings, allowing for more grounded conclusions about the helpful influence of PBL on student development within the surveyed population.

A notable pattern emerges when comparing Figure 1 and Figure 2: a large percentage of students (84.3%) have participated in PBL activities, yet a much smaller percentage (10.9%) consider themselves "very familiar" with the pedagogical approach itself. This observation suggests that students actively engage in project-based activities, but often without explicit pedagogical framing or formal recognition of these experiences as "Project-Based Learning" by their institutions or instructors. This dynamic implies a potential gap where the doing of PBL is more prevalent than the explicit teaching about or naming of PBL, which could hinder students' ability to systematically articulate its benefits or challenges in a structured academic sense. However, the high rate of prior engagement provides a strong empirical basis for the validity of the perceptions expressed throughout the survey. Student perceptions of engagement

are a critical indicator of pedagogical effectiveness. The survey asked respondents to compare the engaging nature of PBL with traditional learning methods. As illustrated in Figure 3, most students (68.6%) reported finding PBL "More engaging" compared to conventional learning methods. An additional 26.2% found it "Equally engaging," while only a small minority (5.2%) perceived it as "Less engaging". These findings strongly indicate a clear student preference for PBL, primarily driven by its inherently engaging nature.

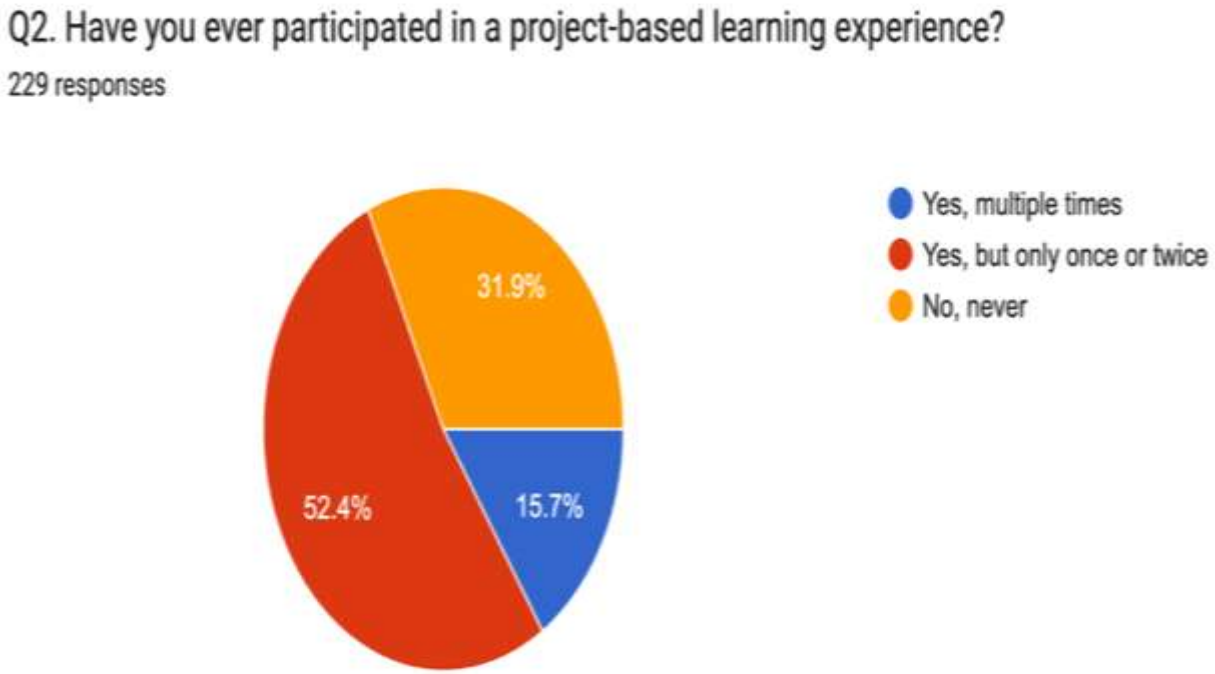

Figure 2: Respondents' participation in project-based learning experiences (N = 229).

This perception aligns robustly with established academic literature. Project-based learning is widely recognised for its capacity to boost student interest and motivation by integrating interdisciplinary learning and connecting academic content to real-world problems. Research consistently suggests that PBL enhances student engagement, intrinsic motivation, and beliefs in their own self-efficacy, thereby promoting meaningful learning and active involvement. The overwhelming sentiment that PBL is "More engaging" strongly suggests that this pedagogical approach effectively activates students' intrinsic motivation, a cornerstone of deep learning. Unlike passive, traditional methods, PBL's emphasis on active participation, real-world problem-solving, and hands-on solutions makes the learning process more personally relevant, dynamic, and stimulating. This intrinsic drive is crucial for fostering deeper cognitive involvement and sustained focus, essential for developing higher-order thinking skills and persistence through complex academic challenges.

Furthermore, high student engagement is a desirable outcome and a critical enabler for more profound and comprehensive learning. When highly engaged students are inherently more likely to invest greater effort, explore complex concepts more deeply, and retain information

effectively. This strong reported engagement, therefore, implies a fertile ground for developing a wide array of complex skills and potentially improved academic achievement, as evidenced by meta-analyses showing positive effects of PBL on various learning outcomes. The high level of engagement observed in this study thus validates PBL's potential to facilitate a more impactful and transformative educational experience, extending its benefits beyond mere content acquisition to encompass broader student development.

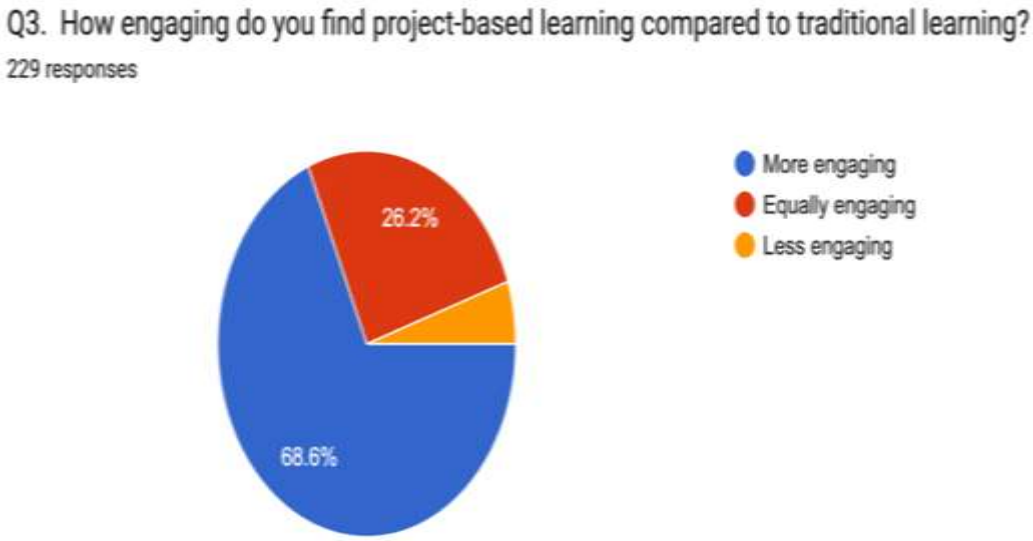

Figure 3: Respondents' perceptions of engagement in project-based learning compared to traditional learning (N = 229).

A central objective of this study was to assess the perceived impact of PBL on the development of key student skills. Figure 4 illustrates that students overwhelmingly identified "Teamwork & collaboration" (77.7%), "Problem-solving" (73.8%), and "Critical thinking" (69.4%) as the top three skills most significantly developed through PBL. "Communication skills" (48.9%) and "Time management" (44.1%) were also perceived as beneficial, though by a notably smaller proportion of respondents. These findings are strongly corroborated by extensive academic literature. PBL is consistently recognised for cultivating essential 21st-century skills, particularly higher-order thinking skills such as critical thinking and problem-solving, which are inherently stimulated by engagement with real-world challenges. The consistent and high percentages for teamwork/collaboration, problem-solving, and critical thinking (all above 69%) directly validate the primary theoretical benefits and pedagogical goals of PBL. This indicates that PBL, as experienced by students in Patiala, is effectively delivering on its core promise to cultivate these essential higher-order thinking and interpersonal skills, which are crucial for navigating complex real-world situations and fostering future-oriented development. Cooperative work within PBL environments is also well-documented for promoting critical thinking, communication, and collaboration skills, aligning with the "4Cs" framework (critical thinking, communication, collaboration, and creativity) frequently cited as a direct outcome of practical PBL approaches. This strong alignment between student perception and established academic theory reinforces the efficacy of PBL in promoting holistic student development within this specific educational context.

While communication skills (48.9%) and time management (44.1%) are acknowledged as being developed, their perceived impact is significantly lower than the top three skills. This suggests a potential area for refinement in PBL design and implementation. For communication, although PBL inherently involves interaction, students may not be explicitly aware of their skill growth, or the instructional scaffolding might not sufficiently emphasise formal communication strategies, such as presentation skills or written reports. This could imply a need for more structured feedback or explicit teaching on effective academic and professional communication within PBL contexts. This finding is particularly critical for time management, given that effective PBL often demands strong self-regulation and meticulous time allocation. Despite high engagement and reported collaboration, the comparatively lower perception of improvement in time management suggests that students may be struggling with this aspect. This highlights a potential tension where the inherent demands of PBL, such as managing complex, multi-week projects, might outpace students' current time management capabilities, necessitating more direct instructional support and explicit strategies for project planning and execution within PBL frameworks.

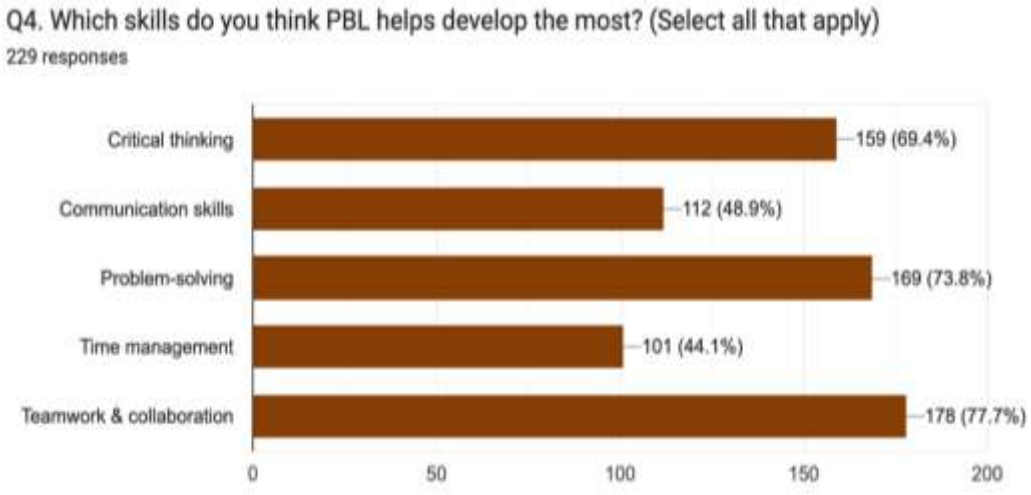

Figure 4.:Respondents' perspectives on skills developed through project-based learning (N = 229).

The study also assessed student perceptions regarding PBL's effectiveness in preparing them for real-world challenges and future careers. Figure 5 demonstrates a strong consensus among students regarding PBL's impact on real-world problem-solving skills. A combined 79.9% of respondents (53.7% "Strongly agree" and 26.2% "Agree") affirmed that PBL improves these skills. Only a small percentage (3.9%) disagreed, with 16.2% remaining neutral. This overwhelming positive perception underscores students' recognition of PBL's practical utility. This finding is consistent with the foundational philosophy of PBL, which is explicitly designed to use complex, authentic problems as a primary vehicle for learning and skill development. Academic research consistently confirms that PBL enhances problem-solving abilities by effectively bridging the gap between theoretical knowledge acquired in the classroom and its practical application in real-world scenarios.

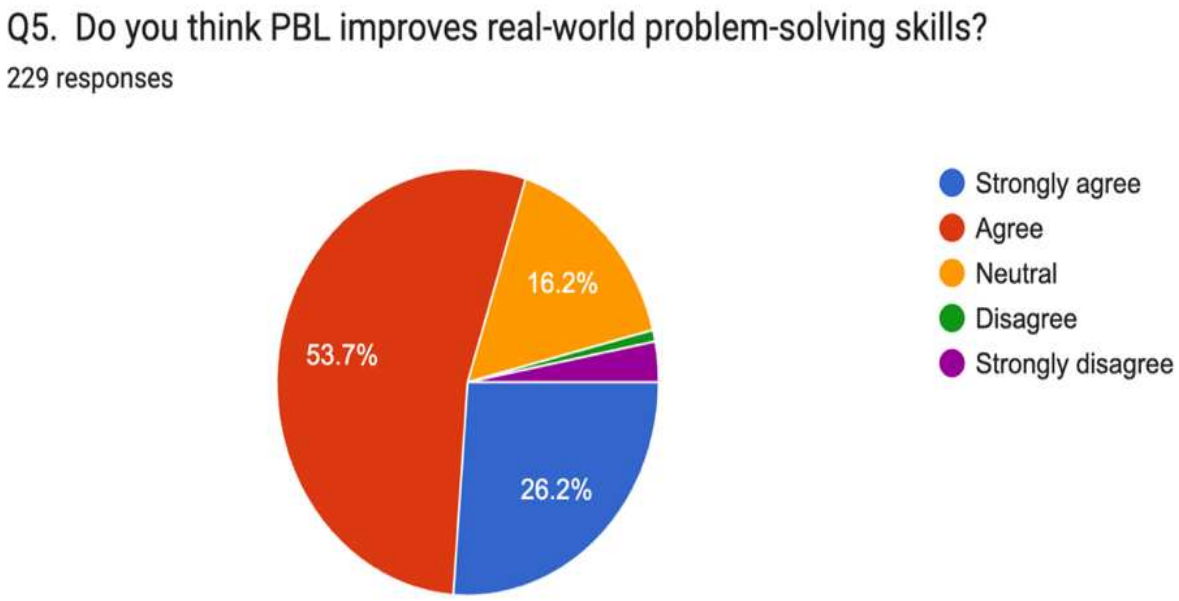

Figure 5: Respondents' perceptions of PBL's impact on real-world problem-solving skills (N = 229).

Furthermore, student perceptions of PBL's role in career preparation are highly favourable. As shown in Figure 6, an overwhelming 88.2% of students (44.5% "Extremely well" and 43.7% "Somewhat well") believe that PBL prepares them well for future careers. Only 10% remained neutral, and a small minority (1.8%) expressed negative perceptions. This strong positive perception highlights PBL's perceived value in fostering students' career readiness. This is strongly supported by academic literature, which indicates that PBL alums demonstrate significantly stronger collaboration skills, problem-solving capacity, and adaptability to workplace changes over time. Employers consistently report critical gaps in essential skills such as critical thinking, communication, collaboration, and adaptability among entry-level professionals; these skills align directly with the "4Cs" framework, a recognised outcome of PBL approaches.

A clear, reinforcing pattern is observed when comparing Figures 4, 5, and 6. The high perceived development of "Problem-solving" skills (73.8%) in Figure 4 directly correlates with the strong agreement (79.9%) that PBL improves "real-world problem-solving skills" in Figure 5. This synergy further extends to Figure 6, where 88.2% of students believe PBL prepares them "Extremely well" or "Somewhat well" for future careers. This strong correlation suggests that students explicitly recognise the practical, transferable skills gained through PBL critical thinking, adaptability, and collaborative problem-solving as directly valuable and applicable in professional settings. This indicates that students perceive PBL as a practical and strategic investment in their future employability, effectively addressing the modern workplace's increasing demand for applied competencies beyond theoretical knowledge. The collective student perception that PBL effectively prepares them for future careers is a powerful endorsement of PBL's relevance in addressing the evolving demands of the contemporary job market. Employers frequently highlight deficits in practical skills, critical thinking, and adaptability among entry-level professionals. The survey results indicate that students

implicitly or explicitly understand that PBL's experiential nature, which involves engaging with authentic problems and working in teams, directly equips them with these sought-after competencies. This positions PBL as a proactive and vital educational strategy for bridging the academic-industry skills gap and enhancing graduates' competitiveness.

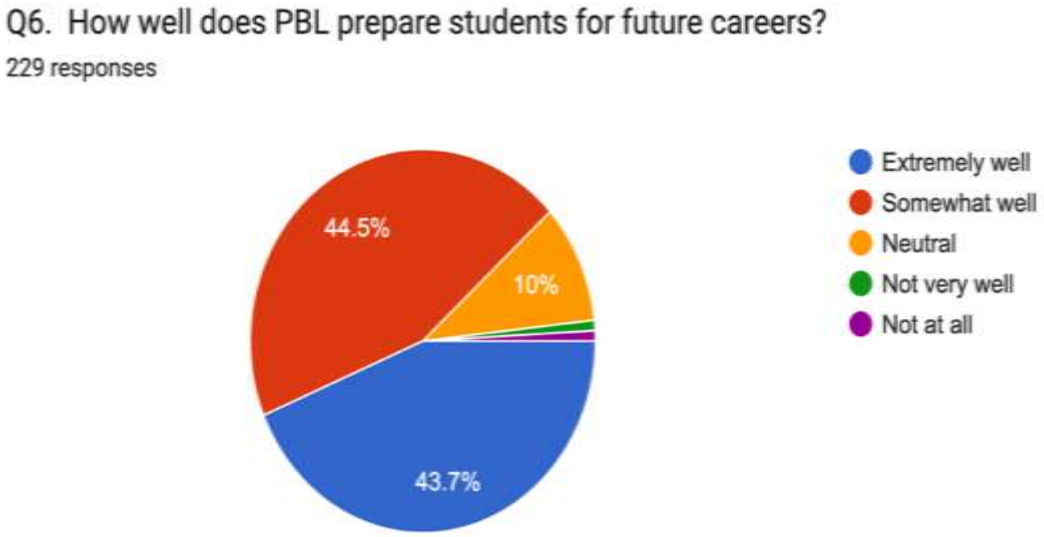

Figure 6: Respondents' views on how well PBL prepares students for future careers (N = 229).

While student perceptions of PBL's benefits are mainly positive, the survey illuminated significant challenges encountered during its implementation. As shown in Figure 7, the most frequently cited challenge by students was "Lack of guidance from instructors" (45%), closely followed by "Managing time effectively" (41.5%). "Difficulty in teamwork/collaboration" (38%) and "Access to resources/tools" (30.1%) were also identified as significant concerns. These challenges pinpoint specific areas where the current implementation of PBL may fall short of optimal student experience. These challenges regarding PBL implementation are well-documented in academic literature. The shift in the instructor's role from a traditional knowledge provider to a facilitator in PBL can lead to a perceived lack of guidance if not managed effectively with appropriate scaffolding. Time management is frequently cited as a significant difficulty for students and educators in PBL contexts, often due to the' open-ended and extended nature of projects. Difficulties in teamwork, including concerns about unequal participation or group dynamics, are also recognised issues hindering project progress.

Instructor involvement and its perceived adequacy are further explored in Figure 8. Here, only 10.5% of students report always receiving support from teachers during PBL, while 45% say they receive support only sometimes, and 32.3% state it occurs rarely or never. These findings complement the challenge-related insights from Figure 7, where lack of guidance was the most reported barrier. This trend highlights a critical bottleneck in PBL implementation. Although PBL advocates often emphasise the role of the teacher as a facilitator rather than a director, this

transition in instructional style requires planning and capacity building. Without consistent mentorship, students may feel overwhelmed or directionless, undermining the core advantages of self-directed learning.

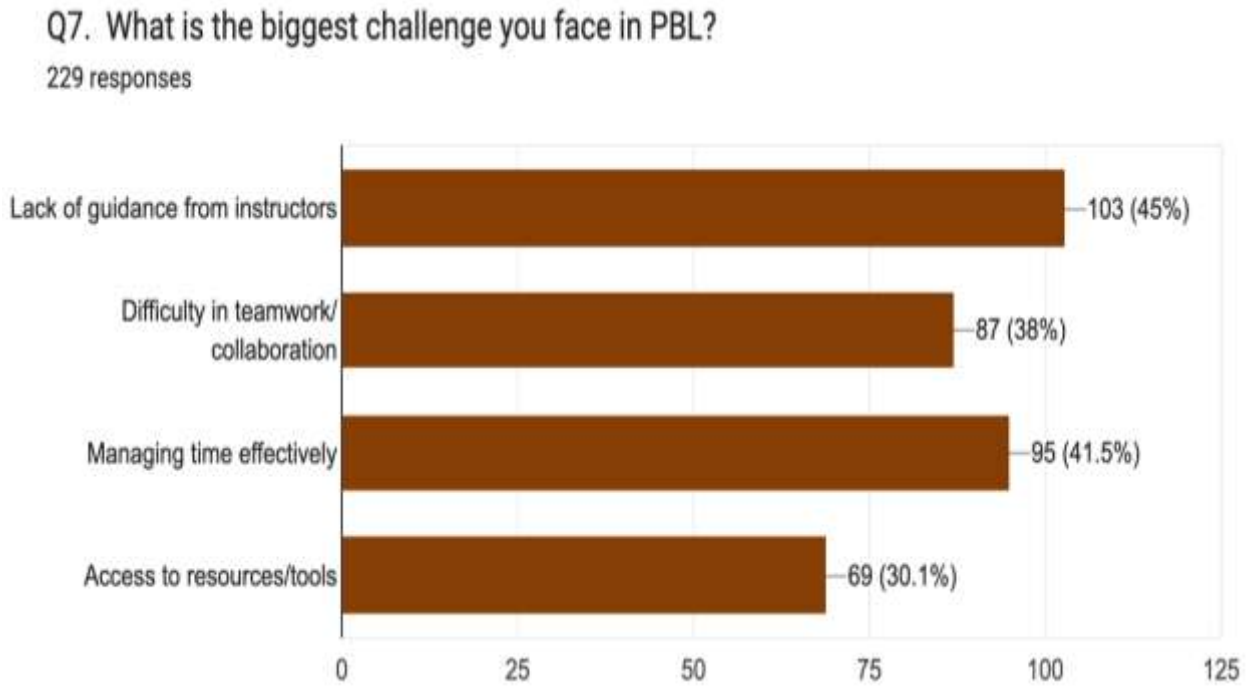

Figure 7: Respondents reported challenges in project-based learning (N = 229).

A direct pattern of concern emerges when comparing Figure 7 and Figure 8. The identification of "Lack of guidance from instructors" as the top challenge (45%) in Figure 7 is strongly corroborated by the inconsistent teacher support reported in Figure 8, where only 10.5% of students felt teachers "Always" provided sufficient support. In comparison, 45% said "Most of the time" and 32.3% "Sometimes". This juxtaposition reveals a critical pedagogical tension: while PBL aims to foster independent inquiry, students desire more structured support or clearer instructor expectations. This suggests that instructors may require more professional development in effective scaffolding techniques providing just enough support to enable progress without undermining student ownership and more transparent communication of their role as facilitators rather than direct problem-solvers.

Furthermore, the high prevalence of "Managing time effectively" (41.5%) in Figure 7 and "Difficulty in teamwork/collaboration" (38%), also in Figure 7, when considered alongside the lower perceived development of "Time management" (44.1%) in Figure 4, indicates a systemic issue within PBL implementation that goes beyond individual student capabilities. These two challenges are often interdependent: poor personal time management can hinder overall group progress, and inefficient group dynamics can result in wasted time and frustration. This suggests that simply assigning group projects is insufficient; explicit instruction in project planning, collaborative strategies, conflict resolution, and time management skills is crucial to mitigate these challenges and ensure a more productive and equitable PBL experience.

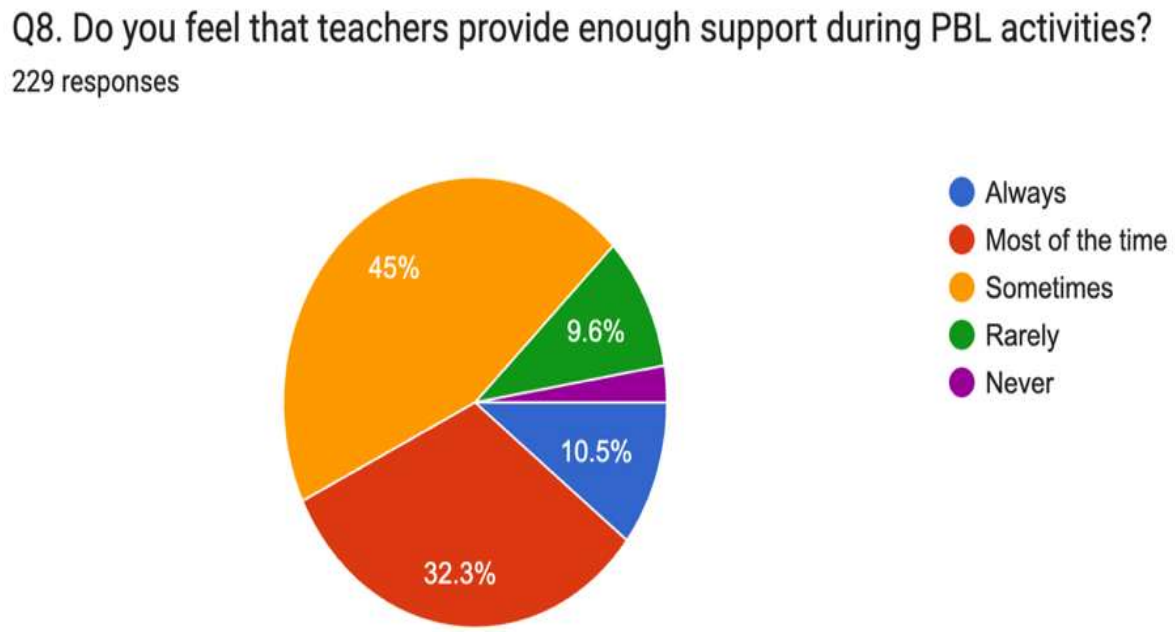

Figure 8: Respondents' perceptions of teacher support during PBL activities (N = 229).

The consistency of these reported challenges with common pitfalls identified in broader academic literature suggests that while PBL is widely adopted, its quality and effectiveness could be significantly enhanced through targeted interventions. These challenges are not merely student-specific issues but reflect broader systemic or pedagogical gaps in how PBL is designed, supported, and executed within the institutions. Addressing these issues (e.g., through comprehensive professional development for instructors, clearer project guidelines, improved access to resources, and refined assessment methods) is vital to maximising the positive impact of PBL and ensuring that student enthusiasm for this approach is met with well-supported, effective learning environments. Student preferences for future integration of PBL into their curricula provide a clear directive for educational planning. As presented in Figure 9, most students strongly desire more PBL in their courses, with 68.1% responding "Yes, definitely" and 29.3% indicating "Maybe, depending on the subject." Only a negligible 2.6% preferred traditional learning. This finding represents a clear and powerful student mandate for expanded PBL opportunities within their curricula. The nearly unanimous desire for more PBL (97.4% combined "Yes, definitely" and "Maybe") is arguably the most compelling finding of the survey. This goes beyond a mere preference for an alternative teaching method; it signals a strong student belief in PBL's tangible efficacy for their holistic development and future career preparedness, extending "Beyond the Classroom." This provides a clear and powerful mandate for educational institutions to continue and strategically expand their PBL offerings, indicating that students actively seek more experiential and applied learning opportunities.

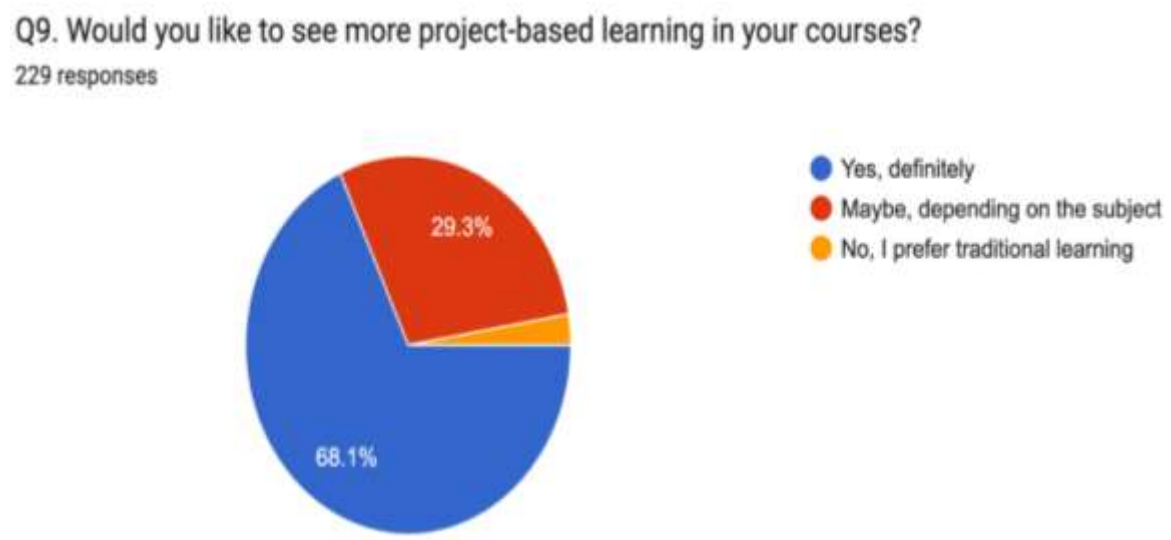

Figure 9: Respondents' preferences for incorporating more project-based learning in courses (N = 229).

Further insights into student preferences for project modalities are revealed in Figure 10, which illustrates the types of projects students find most beneficial for learning. "Industry-based projects (real-world problems)" were favoured most (63.8%), followed closely by "Group projects" (56.8%) and "Technology-based projects (coding, AI, robotics, etc.)" (54.1%). "Research-oriented projects" (36.7%) and "Individual projects" (31.4%) were less preferred. This highlights students' inclination towards authentic, collaborative, and technologically relevant project experiences. The high preference for industry-based projects aligns with PBL's emphasis on real-world relevance and career preparation, as these projects provide hands-on experience and insights into industry trends. The strong endorsement of group projects further reinforces the perceived value of collaboration in learning, as group work fosters social competence, communication, and teamwork skills.

A compelling pattern emerges when comparing student preferences in Figure 10 with perceived skill development in Figure 4 and career readiness in Figure 6. The strong preference for "Industry-based projects" (63.8%) and "Group projects" (56.8%) in Figure 10 directly aligns with the high perceived development of "Teamwork & collaboration" (77.7%) and "Problem-solving" (73.8%) in Figure 4. This indicates that students actively seek project modalities that reinforce the skills they find most enhanced by PBL. Furthermore, the strong preference for "Industry-based projects" is consistent with the overwhelming belief (88.2%) that PBL prepares them well for future careers, as shown in Figure 6. This suggests that students intuitively understand the direct link between engaging with authentic, industry-relevant problems and developing the competencies required for professional success. This implies that for PBL to be most beneficial and impactful, future initiatives should prioritise designing and implementing projects that simulate professional environments and inherently encourage teamwork, moving away from purely theoretical or individual assignments. This highlights the importance of fostering stronger industry-academia partnerships to identify and pursue relevant and impactful projects.

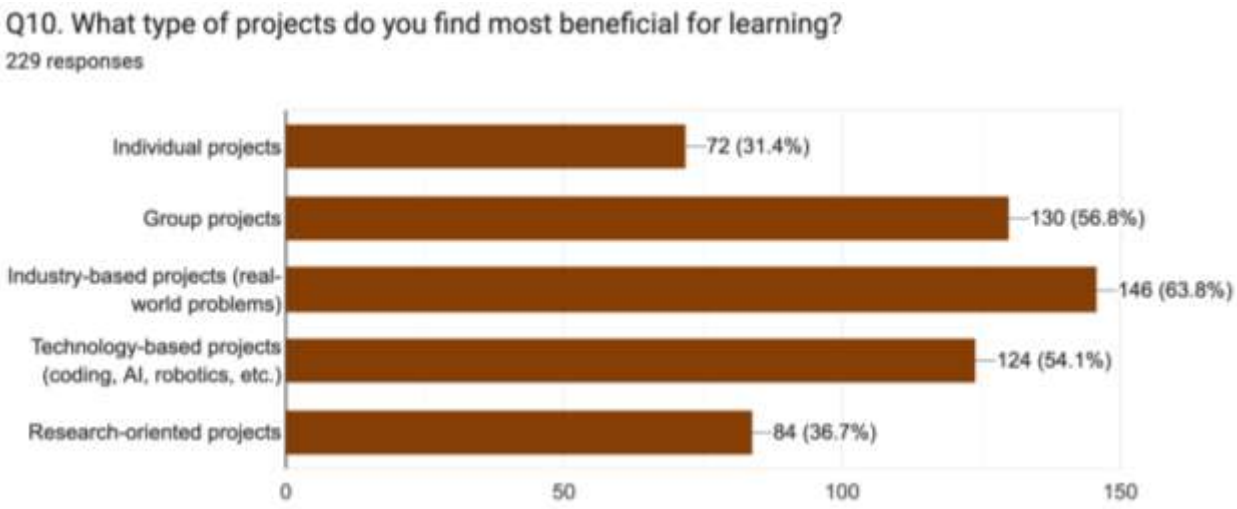

Figure 10: Respondents' views on the most beneficial types of projects for learning (N = 229).

Although students primarily advocate for enhanced Project-Based Learning (Figure 9), this demand must be assessed in light of the recognised obstacles (Figure 7), such as insufficient direction, time management difficulties, and collaboration concerns. Increasing the volume of PBL without addressing quality issues may lead to student dissatisfaction, worse learning results, and a potential decline in the current favourable disposition. Effectively meeting student demand and maximising developmental benefits from PBL necessitates proactive institutional investment in pedagogical support, provision of clear and explicit project management and collaborative system education, and appropriate resource allocation. It guarantees that enhanced PBL is sustainable, advantageous, and contributes to student growth rather than imposing additional effort. Despite the predominant favourable perceptions and significant demand for PBL (Figure 9), the study also reveals critical problems in its implementation that require urgent attention. The primary concerns expressed by the students include a perceived deficiency in "instructor guidance" and persistent challenges in "effective time management." Challenges related to "difficulty in teamwork/collaboration" and "accessing resources/tools" are significant problems. These findings reflect the broader academic discourse on common obstacles associated with PBL implementation, indicating that, while the concept of PBL is highly valued, its execution is often inconsistent or inadequately supported within the current educational framework. The observed diversity in perceived teacher assistance highlights the need for more uniform, clear, and compelling pedagogical facilitation.

The student survey findings from Patiala provide compelling evidence in support of the efficacy of Project-Based Learning as a revolutionary pedagogical approach. The students highly value their unique capacity to engage them, instil essential 21st-century skills, and significantly enhance their job market readiness, contributing comprehensively to their growth. To harness the extensive potential of PBL and maintain sustained momentum, educational institutions must adopt a comprehensive strategy to address the highlighted implementation problems. This entails refining the teacher support models, providing explicit instruction in

project management and collaborative behaviours, and ensuring sufficient access to resources. By addressing these areas proactively, institutions can ensure that the expansion of PBL leads to a truly integrated development of students, better preparing graduates to confront the problems and complexities of the workforce more successfully. The evidence serves as a definitive directive for educational reform, advocating for the extensive, well-structured, and strongly endorsed integration of genuine, collaborative, and real-world project-based learning experiences.

5. Conclusion

The educational landscape of the 21st century necessitates a paradigm change from outdated paradigms of passive information acquisition to dynamic, experiential learning that fosters adaptive and future-ready individuals. This research, "Beyond the Classroom: Examining the Influence of Project-Based Learning on Student Development," rigorously explores this critical issue, presenting persuasive empirical evidence from Patiala, Punjab, that solidly positions Project-Based Learning (PBL) as fundamental to comprehensive student development. Our extensive study clearly indicates that PBL is not just an alternate teaching method but a powerful driver for transformative learning. The findings align with the worldwide discussion, highlighting PBL's distinctive ability to connect theoretical concepts with practical applications. A notable 68.6% of students deemed PBL "more engaging" than conventional techniques, highlighting its ability to stimulate intrinsic motivation and enhance cognitive engagement. As our data indicates, this increased involvement closely coincides with the significant advancement of crucial 21st-century skills. The foundation of PBL's impact is its exceptional capacity to develop essential skills. Our data clearly demonstrates that students mostly recognise substantial improvement in "Teamwork & collaboration" (77.7%), "Problem-solving" (73.8%), and "Critical thinking" (69.4%). These numerical figures are not mere statistics; they signify a generation of learners actively developing the essential skills identified by the World Economic Forum as crucial for the future workforce [1].

Furthermore, the resounding agreement among students, 79.9% agreeing that PBL fosters "real-world problem-solving skills" and an astounding 88.2% thinking it prepares them "Extremely well" or "Somewhat well" for future careers underlines the crucial role PBL plays in improving career preparation and closing the ongoing knowledge gap between academia and industry. Through experiential education, students develop their future careers in addition to acquiring knowledge. Although PBL has considerable potential, our research also identifies serious execution issues that require careful consideration and practical solutions. Together with difficulties in the areas of cooperation and resource availability, the pressing problems at hand, "Effective time management" (41.5%) and "Insufficient guidance from instructors" (45%), provide essential guidelines for action. A fundamental teaching contradiction is shown by the startling finding that only 10.5% of students "always" receive appropriate teacher aid in the area of project-based learning: autonomy without sufficient scaffolding may unintentionally undermine the goal of the intervention. Learning institutions must adopt a comprehensive strategy to realise the enormous potential of PBL. Teachers must get comprehensive professional development to advance from being only knowledge carriers to competent mentors and facilitators. To effectively equip students to handle the intricacies of

group procedures and time management, specialised training in project management, collaborative techniques, and dispute resolution is required.

Furthermore, to prevent gaps from widening and to promote the development of inclusive learning communities, it is essential to provide fair access to tools and resources. The findings of the Patiala student poll are striking: 97.4% of respondents strongly indicated that they would like to see more possibilities for PBL, giving a resounding "Yes, definitely" or "Maybe, depending on the subject." This overwhelming mandate forces educational transformation and requires institutions to systematically integrate real-world, collaborative, and authentic project-based learning into all of their courses. The significant preference for "Industry-based projects (real-world problems)" (63.8%) emphasises the need for more industry-academia collaborations in the future to keep education extremely relevant and robust. PBL is a transformational education philosophy and teaching style that adapts to the ever-changing demands of a rapidly evolving world. The education community is prepared to ensure the success of PBL and raise a critical-thinking, collaboratively motivated, and dynamic generation ready to thrive "Beyond the Classroom," creating a bright future by proactively addressing the challenges of implementing PBL and meeting the particular needs of our students.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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