

Teachers' Adaptive Agency in Project-Based Learning: Belief–Practice Alignment in Secondary Education

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Abstract

Project-Based Learning (PjBL) has been widely promoted as a student-centered pedagogy that supports the development of 21st-century skills; however, its effectiveness depends largely on how teachers' beliefs are translated into classroom practice. This study examines high school teachers' beliefs and practices related to PjBL across three interconnected dimensions: professional development (training), classroom implementation, and reflection. Employing an explanatory sequential mixed-methods design, quantitative data were collected through a questionnaire administered to 36 high school teachers in Katingan Regency, Central Kalimantan, followed by semi-structured interviews with three selected participants to explore belief–practice alignment and contextual influences in greater depth. Quantitative findings revealed consistently high mean scores for both beliefs and practices across all three dimensions, indicating a generally strong alignment between teachers' conceptual endorsement of PjBL and their reported enactment. However, areas of partial misalignment emerged in practices requiring sustained autonomy and long-term pedagogical change, particularly self-directed professional development, facilitation of student agency and project authenticity, and the systematic integration of reflective insights into future lesson planning. Qualitative findings confirmed that while teachers value PjBL and adapt it flexibly to classroom realities, structural constraints, such as curriculum demands, limited training continuity, and assessment pressures, limit deeper implementation. The study concludes that teachers demonstrate adaptive agency in implementing PjBL, with belief–practice alignment strengthened when supported by institutional facilitation, mentoring, and reflective cultures. Sustained professional development and contextual support are therefore essential to move PjBL beyond procedural adoption toward a more profound, transformative pedagogical practice.

Keywords: Project-based learning, professional development, reflection, teacher beliefs.

INTRODUCTION

Project-Based Learning (PjBL) has gained increasing prominence in contemporary education as a student-centered pedagogical approach that emphasizes active inquiry, authentic problem-solving, and meaningful knowledge construction (Musa et al., 2012; Kokotsaki et al., 2016; Putri et al., 2023; Aisyah & Novita, 2025). Grounded in constructivist learning theory, PjBL positions learners as active agents who engage in extended, inquiry-driven projects that integrate disciplinary knowledge with real-world contexts, thereby fostering more profound and more meaningful learning experiences (Astawa et al., 2017; Eswaran, 2024). The approach has been widely associated with the development of essential 21st-century skills, including critical thinking, collaboration, creativity, and communication, which have become central priorities in many national and international curriculum frameworks (Ngadiso et al., 2021; Norawati & Puspitasari, 2022; Song et al., 2024). In secondary education, PjBL has increasingly been adopted to address calls for more engaging, relevant, and skills-oriented instruction, shifting classroom practices away from teacher-dominated transmission models toward participatory and inquiry-based learning environments (De Oliveira Biazus & Mahtari, 2022; Siswono et al., 2018; Rohmaniyah & Asih, 2024). Within EFL and multilingual contexts, PjBL has also been recognized for its potential to support language development through authentic communication, collaborative tasks, and contextualized language use (Sartika et al., 2022; Khoudri et al., 2023). As educational systems increasingly emphasize competence-based curricula and learner autonomy, PjBL is no longer viewed as an optional instructional innovation but rather as a pedagogical approach closely aligned with contemporary policy directions and curriculum reforms aimed at preparing students to meet complex academic, social, and professional demands.

Despite its strong theoretical foundations and widespread curricular endorsement, the enactment of Project-Based Learning (PjBL/PBLL) in classroom practice remains uneven, particularly in EFL/ESL contexts. Empirical research indicates considerable variation in how teachers interpret, adapt, and sustain PjBL across instructional settings, reflecting differences in pedagogical beliefs, professional preparation, and contextual constraints (Cahyono et al., 2024; Ngadiso et al., 2021; Sun & Zhu, 2023; Yang et al., 2025). The inclusion of PjBL in curriculum documents or lesson plans does not necessarily guarantee its meaningful realization in day-to-day English teaching, especially in contexts where accountability requirements, assessment pressures, and time limitations shape what is pedagogically feasible (Deng & Carless, 2010; Lee & Coniam, 2013; Tao & Gao, 2017; Yang et al., 2025). This discrepancy suggests that the value of PjBL/PBLL cannot be understood solely through its design principles or reported outcomes; instead, it must be examined through how teachers operationalize these principles in situ (Sun & Zhu, 2023; Tao & Gao, 2017). Teachers exercise professional judgment in structuring projects, determining the degree of learner autonomy, balancing scaffolding with independence, and foregrounding authenticity and real-world relevance in English tasks and learning products (Yang et al., 2025; Yuliani & Lengkanawati, 2017). These instructional decisions reflect teachers' agency, beliefs, prior experiences, and professional learning, as well as their capacity to navigate contextual constraints while sustaining pedagogical change (Jalilzadeh & Coombe, 2023; Tao & Gao, 2017).

Teachers' beliefs are central to how pedagogical approaches are understood and enacted because, within teacher cognition, beliefs operate as cognitive filters that shape

instructional decision-making, openness to innovation, and persistence in the face of contextual constraints (Borg, 2011; Graham et al., 2014). In Project-Based Learning (PjBL) for EFL contexts, what teachers believe about learners' capability, the degree of instructional control needed, curriculum/standards fit, and the practicality of assessment directly influences how projects are designed, facilitated, and evaluated (Garib et al., 2023; Grant, 2017; Markula & Aksela, 2022; Toolin, 2004). Importantly, research also indicates that teachers may strongly endorse PjBL conceptually while still modifying, simplifying, or selectively implementing its core principles during classroom enactment—often by limiting student autonomy, narrowing project scope, or increasing teacher direction to manage time pressure, coverage demands, and accountability requirements (Garib et al., 2023; Grant, 2017; Guo et al., 2020; Markula & Aksela, 2022). This recurring divergence supports the need to examine belief–practice alignment (and the conditions shaping it) rather than treating beliefs or practices as isolated constructs, especially in language teaching where tensions between stated beliefs and enacted practice are everyday (Basturkmen, 2012; Farrell & Ives, 2015). Seen through an agency lens, teachers are not passive implementers of prescribed methods but active agents who interpret, negotiate, and adapt PjBL to local realities; in PjBL settings, such agency is visible as teachers simultaneously act as designers, facilitators, and mediators who balance pedagogical ideals with institutional constraints (Ahmad & Shah, 2022; Biesta et al., 2017; Wang, 2022). From this perspective, “adaptive agency” captures teachers' context-sensitive professional judgment in adjusting project scope, scaffolding autonomy and inquiry, and aligning project work with curriculum and assessment demands—adaptations that often function as strategic responses to real classroom conditions rather than evidence of weak commitment to student-centered principles (Grant, 2017; Markula & Aksela, 2022; Oosterhoff et al., 2020).

Existing literature consistently demonstrates the pedagogical potential of Project-Based Learning (PjBL) across educational levels and subject areas, particularly in promoting higher-order thinking and meaningful learning. At the secondary school level, Putri et al. (2023) found that integrating PjBL with a differentiated approach led to substantial improvement in students' critical thinking skills, suggesting that projects designed to accommodate learner diversity can enhance cognitive engagement. Similarly, De Oliveira Biazus and Mahtari (2022) found that secondary students exposed to PjBL significantly outperformed those taught through direct instruction in creative thinking, suggesting that project-based tasks provide richer opportunities for idea generation, flexibility, and elaboration. In the domain of language education, Cahyono et al. (2024) reported, through a meta-analysis of EFL/ESL writing studies, a significant overall effect of PjBL on writing performance, with intervention duration emerging as a key factor influencing instructional effectiveness. Complementing this large-scale evidence, Grant (2017) demonstrated that Project-Based Language Teaching in a university EAP context fostered meaningful language use, learner autonomy, and motivation, while Ngadiso et al. (2021) documented positive classroom dynamics and favorable perceptions among both teachers and students in Indonesian secondary EFL classrooms implementing PjBL. Beyond learner outcomes, research focusing on teachers' perspectives reveals that educators generally hold positive views of PjBL and recognize its value in enhancing engagement and skill development; however, Aisyah and Novita (2025) highlighted that successful implementation is strongly

mediated by contextual factors such as professional training, institutional support, and available resources.

Despite growing empirical evidence supporting the effectiveness of Project-Based Learning (PjBL) across educational contexts, existing research has predominantly emphasized student outcomes or general perceptions of PjBL, leaving limited understanding of how teachers' pedagogical beliefs are translated into sustained classroom practice. In particular, few studies have systematically examined the alignment between teachers' beliefs and their enacted practices across key professional dimensions, including training experiences, classroom implementation, and reflective teaching. Moreover, while prior research has acknowledged contextual constraints such as curriculum demands, assessment pressures, and resource availability, these factors are often treated as background conditions rather than analytically examined in relation to belief–practice alignment. As a result, how teachers negotiate professional development opportunities, instructional decision-making, and reflective processes in enacting PjBL remain underexplored, especially in secondary education settings. Addressing this gap, the present study seeks to examine teachers' beliefs about PjBL in relation to training, classroom implementation, and reflection, to explore the extent to which these beliefs align with reported practices, and to identify contextual and professional development factors that shape alignment or misalignment between belief and practice.

METHOD

This study adopts an explanatory sequential mixed-methods design implemented in two connected phases, in which quantitative survey findings provide an initial pattern-based account, and qualitative interviews are used to explain and contextualize those patterns through integration across phases (Schoonenboom & Johnson, 2017; Stoecker & Avila, 2020). In Phase 1, a questionnaire is administered to high school teachers to identify broad tendencies in belief–practice alignment and reflective engagement related to Project-Based Learning (PjBL), reflecting mixed methods guidance that surveys can establish general trends that then shape qualitative follow-up (McKim, 2017). The quantitative phase involves 36 high school teachers from Katingan Regency, Central Kalimantan, invited through open participation to capture a range of perspectives, while acknowledging that nonprobability recruitment prioritizes access and feasibility over statistical representativeness (Etikan, 2016).

This study employed an explanatory sequential mixed-methods design consisting of two interconnected phases. In Phase 1, quantitative data were collected using a structured questionnaire comprising 84 items organized into three dimensions: Training (items 1–21), Practice (items 22–63), and Reflection (items 64–84), which examined teachers' beliefs and reported practices related to professional development, classroom implementation of Project-Based Learning (PjBL), and reflective engagement concerning student learning and instructional improvement. Building on the survey findings, Phase 2 involved semi-structured interviews with three teachers recruited through convenience sampling from survey respondents who volunteered to participate. The interviews were designed to provide deeper explanations of how teachers interpret PjBL and how contextual conditions shape its enactment, with participant selection and question development informed by Phase 1 results to preserve the explanatory sequential logic (Fetters & Tajima, 2022). A 28-

item interview guide aligned with the exact three dimensions—Training (items 1–7), Practice (items 8–21), and Reflection (items 22–28)—was used to ensure conceptual coherence while allowing flexibility to explore emergent issues through open-ended questioning (Rowley, 2012). Qualitative sampling was guided by explanatory relevance rather than sample size, with adequacy determined through focused inquiry and attention to whether additional interviews yielded new themes (Fusch & Ness, 2015; Suri, 2011). Integration was strengthened at both the design and analysis stages by explicitly linking quantitative trends to qualitative explanations and documenting how the two data strands jointly informed the final interpretation (Moseholm & Fetters, 2017; Turner et al., 2017; Uprichard & Dawney, 2019).

In Phase 1, questionnaire data were analyzed using descriptive statistical procedures to summarize overall patterns in teachers' beliefs, reported practices, and reflective engagement related to Project-Based Learning (PjBL), consistent with descriptive approaches commonly employed in survey-based educational research (Nassaji, 2015). In Phase 2, interview data were analyzed through thematic analysis to identify recurring patterns that explain how teachers' beliefs are enacted in classroom practice and how contextual enablers and constraints shape PjBL implementation. To ensure analytical rigor and trustworthiness, the qualitative analysis followed systematic coding and theme development procedures as recommended in established qualitative methodology literature (Nowell et al., 2017).

The questionnaire items were examined using item–total correlation analysis (Pearson correlation in SPSS) to assess internal consistency and item discrimination; items with weak associations with the overall scale were considered for revision or removal. Internal consistency reliability was assessed using Cronbach's Alpha for each questionnaire section. Although Cronbach's Alpha remains widely reported, its interpretation was approached cautiously in line with contemporary psychometric recommendations that emphasize careful use and complementary item-level diagnostics to support reliability claims (Trizano-Hermosilla & Alvarado, 2016). For the interview instrument, content validity was established through expert judgment, reflecting a validity framework that emphasizes the relevance and representativeness of interview prompts. The level of expert agreement was quantified using Aiken's V coefficient, which was employed to guide decisions regarding item clarity and revision (Merino-Soto, 2018). To enhance qualitative credibility, member checking was conducted by returning interview transcripts and interpretive summaries to participants for confirmation and refinement, thereby supporting interpretive accuracy and transparency in the qualitative findings (McKim, 2023).

FINDING AND DISCUSSION

This study examined high school teachers' beliefs and experiences with Project-Based Learning (PjBL) across three interconnected dimensions: training, implementation, and reflection and impact, using a sequential explanatory mixed-methods design. Survey data from 36 teachers were complemented by interviews with three participants (Elina, Diana, and Natalia) to explore whether teachers' beliefs about PjBL align with their actual classroom practices.

Training: Understanding, Relevance, and Professional Growth

Quantitative findings indicate that teachers held strong positive beliefs about the value of training related to Project-Based Learning (PjBL) ($M = 5.03$) and reported similarly high levels of engagement in training-related practices ($M = 4.98$). This close correspondence suggests a general alignment between teachers' recognition of the importance of professional development and their reported efforts to engage in learning opportunities that support PjBL implementation. Teachers largely viewed training as a means to enhance pedagogical confidence, instructional flexibility, and readiness to adopt student-centered practices. However, qualitative data reveal that this alignment is not uniform across all forms of professional learning. Interviews suggest that while teachers strongly value PjBL training, sustained engagement beyond formal or externally provided programs remains limited. Elina reflected on the experiential nature of her learning, noting, *"I never participated in PjBL training before, but when I applied it, I noticed my students learned better."* This indicates that practice-based experimentation often substitutes for structured training. Similarly, Diana described relying on informal learning, stating that she *"usually reads about PjBL on her own and learns through trial and error."* Natalia echoed this experience, explaining that *"there is not always follow-up after training, so I try to adapt what I remember from workshops to my class situation."* These accounts highlight a belief-practice gap in which teachers acknowledge the importance of training but face constraints in sustaining systematic, self-directed professional development. Thus, while beliefs and practices align in terms of perceived relevance, continued professional learning remains an underdeveloped aspect of PjBL enactment.

Implementation: Translating Beliefs into Classroom Action

Teachers reported strong beliefs about the principles of PjBL implementation ($M = 5.05$), which closely matched high practice scores ($M = 5.03$), indicating substantial alignment between pedagogical conviction and classroom enactment. Survey responses suggest that teachers frequently design collaborative, inquiry-oriented tasks and view PjBL as a strategy for fostering creativity, engagement, and active learning. These practices reflect teachers' confidence in the pedagogical value of PjBL and their willingness to integrate it into daily instruction. Nonetheless, areas of partial misalignment were observed in relation to student autonomy and project authenticity. Quantitative items addressing student choice and real-world problem design showed slightly lower scores, suggesting that while teachers conceptually endorse these principles, their practical application is constrained. Interview data corroborate this pattern. Elina emphasized the importance of learner empowerment, stating, *"Allowing students to make decisions empowers them."* However, she also acknowledged that *"sometimes the curriculum timeline does not allow students to explore freely."* Diana similarly noted that assessment demands often require her to provide more structured guidance, explaining that *"projects still need to fit the exam objectives."* Natalia described adapting PjBL to student readiness by *"mixing students of different abilities and guiding each step so no one is left behind."* These adaptive practices illustrate teachers' flexibility and professional judgment, and indicate that PjBL is frequently modified to align with classroom realities. As a result, alignment between belief and practice is strong in intent but varies in depth, particularly in relation to fostering full student agency and authentic inquiry.

Reflection and Impact: Growth, Critical Thinking, and Instructional Change

In the reflection dimension, teachers again demonstrated high levels of belief ($M = 5.02$) and practice ($M = 5.00$), suggesting strong alignment between valuing reflection and incorporating reflective activities into classroom routines. Teachers perceived PjBL as beneficial not only for students' critical thinking and engagement but also for their own professional growth. Elina articulated this dual impact, stating, *"PjBL has helped me grow as a teacher. It also helps my students apply what they learn in real-life situations."* Interview data further indicate that reflective practices are commonly enacted through peer feedback and post-project evaluation. As Elina explained, *"After every project, we reflect on what went well and what needs improvement."* Diana added that reflection helps her *"understand which parts of the project worked and which confused students."* Natalia described reflection as a way to *"adjust future projects, even if not everything can be changed immediately."* Despite strong alignment at the classroom level, quantitative data show slightly lower scores on items related to using reflective insights for long-term lesson redesign. This suggests that while teachers engage in immediate reflection, they do not always translate these insights into sustained instructional transformation. Consequently, reflective beliefs are enacted consistently in short-term practice but only partially inform longer-term pedagogical planning.

DISCUSSION

The findings demonstrate a generally strong alignment between teachers' beliefs and practices in implementing Project-Based Learning (PjBL), while also revealing patterned misalignments shaped by professional learning conditions and contextual constraints. This configuration reflects well-established insights in teacher cognition research that beliefs and practices often correspond at a conceptual level but diverge when institutional realities mediate pedagogical ideals (Basturkmen, 2012; Borg, 2011; Graham et al., 2014). Teachers' strong endorsement of PjBL training and their reported engagement in related practices suggest that professional development contributes to pedagogical confidence and teacher agency, particularly when it is perceived as relevant to classroom needs and instructional goals (Ahmad & Shah, 2022; Oosterhoff et al., 2020). However, the reliance on self-directed learning and informal experimentation observed in the findings points to fragmented professional learning systems, reinforcing evidence that the impact of training on sustained practice depends on continuity, mentoring, and institutional support rather than isolated workshops (Guo et al., 2020; Aisyah & Novita, 2025).

In classroom enactment, teachers' beliefs in the pedagogical value of PjBL were reflected mainly in collaborative, inquiry-oriented instructional practices, aligning with previous studies documenting positive PjBL implementation in secondary and EFL contexts (Ngadiso et al., 2021; Markula & Aksela, 2022; Sartika et al., 2022; Rohmaniyah & Asih, 2024). Nevertheless, the moderated enactment of student autonomy and project authenticity identified in this study mirrors findings that teachers often adapt innovative pedagogies to comply with curriculum pacing, assessment regimes, and examination-driven accountability systems (Deng & Carless, 2010; Lee & Coniam, 2013; Tao & Gao, 2017). Such adaptations are consistent with research on teacher agency, which conceptualizes teachers not as passive implementers but as active decision-makers who negotiate pedagogical commitments within structural constraints (Biesta et al., 2017; Tao & Gao, 2017; Wang,

2022). In this sense, the observed misalignments reflect adaptive agency rather than resistance, as teachers recalibrate PjBL principles to sustain instructional feasibility while preserving core learning goals (Yuliani & Lengkanawati, 2017; Garib, 2022).

Reflection emerged as a dimension characterized by strong alignment between beliefs and practice at the classroom level, with teachers routinely engaging in feedback and evaluative activities. This finding supports research highlighting reflection as a key mechanism through which teachers examine practice, consolidate learning, and enhance instructional awareness (Farrell & Ives, 2014; Graham et al., 2014). However, the limited translation of reflective insights into long-term curricular redesign aligns with evidence that reflection becomes transformative only when embedded within sustained professional learning structures and supported by institutional cultures that legitimize inquiry-oriented teaching (Ahmad & Shah, 2022; Oosterhoff et al., 2020). Without such structures, reflection tends to remain procedural, contributing to short-term improvement rather than systemic pedagogical change.

Across all dimensions, belief–practice alignment emerged as a context-dependent equilibrium rather than a stable state, maintained through continuous adjustment to resources, administrative expectations, and assessment systems. Similar patterns have been documented in PjBL and PBLT research across EFL and multilingual contexts, where positive beliefs coexist with pragmatic constraints that shape enactment (Aisyah & Novita, 2025; Garib, 2022; Sun & Zhu, 2023; Yang et al., 2025). These findings reinforce the view that teacher beliefs are dynamic cognitive frameworks that interact with sociocultural and institutional environments, evolving through experience rather than functioning as fixed predictors of practice (Biesta et al., 2017; Wang, 2022). Collectively, the results affirm that while teachers’ beliefs are a necessary foundation for PjBL implementation, sustained and transformative enactment depends on institutional conditions that support ongoing professional learning, curricular flexibility, and reflective practice, positioning PjBL as a pedagogy enacted through teachers’ adaptive agency rather than a uniformly transferable method (Ngadiso et al., 2021; Kokotsaki et al., 2016; Sun & Zhu, 2023).

CONCLUSION

This study investigated the alignment between teachers’ beliefs and practices in implementing Project-Based Learning (PjBL) across the dimensions of training, classroom implementation, and reflection. The findings indicate a generally strong alignment between beliefs and practice, suggesting that teachers have internalized PjBL as a meaningful pedagogical approach and actively enact its core principles in classroom practice. At the same time, the study reveals patterned misalignments that emerge when pedagogical ideals are mediated by professional learning structures and contextual constraints, confirming that belief–practice coherence in PjBL is dynamic rather than fixed.

Teachers’ positive beliefs about the value of PjBL training were reflected mainly in their engagement with professional learning; however, reliance on self-directed learning and informal experimentation highlights limitations in the continuity and institutionalization of professional development. In classroom enactment, teachers’ endorsement of PjBL translated into collaborative and inquiry-oriented practices. However, student autonomy and project authenticity were often moderated to accommodate curriculum pacing, assessment demands, and accountability pressures. These adaptations reflect teachers’

adaptive agency rather than resistance, as they negotiate between pedagogical commitments and structural realities. Reflection was consistently valued and practiced at the classroom level, supporting short-term instructional improvement. However, its potential to drive long-term pedagogical transformation remained constrained in the absence of sustained institutional support.

The findings suggest that while teachers' beliefs constitute a necessary foundation for PjBL implementation, they are insufficient on their own to ensure deep and sustained pedagogical change. Effective and enduring enactment of PjBL depends on professional learning systems that are continuous and contextually grounded, curricular structures that allow for authentic inquiry and learner autonomy, and reflective cultures that extend beyond individual classrooms. Viewing PjBL as a pedagogy enacted through teachers' adaptive agency provides a more realistic understanding of its implementation in secondary education and underscores the importance of aligning institutional conditions with teachers' pedagogical commitments. Future research may build on this study by employing longitudinal designs, classroom observations, or comparative analyses across educational contexts to further examine how belief–practice alignment evolves and how policy, assessment systems, and professional development models shape the sustainability of PjBL practices.

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