

Project-Based Learning and Higher-Order Thinking Skills in EFL Contexts: A Systematic Review

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ABSTRACT

This study examined the implementation of Project-Based Learning (PjBL) in English as a Foreign Language (EFL) contexts to promote Higher-Order Thinking Skills (HOTS). A Systematic Literature Review (SLR) was conducted on 25 empirical studies published between 2021 and 2026 using predefined inclusion criteria and the PRISMA framework. The reviewed studies indicate that PjBL is frequently associated with the development of HOTS, particularly critical thinking (72%), followed by creativity (28%) and problem-solving (20%). The review identified five major categories of project outputs, including digital projects, performance-based tasks, academic writing, creative-cultural works, and integrated classroom projects. Rubric-based assessment emerged as the most commonly used assessment method, although assessment practices remained inconsistent across studies. Several studies also reported challenges related to time constraints, teacher readiness, and variations in implementation strategies. In addition, PjBL was commonly integrated with technology-based and collaborative learning approaches in EFL classrooms. This review contributes to the literature by synthesizing patterns of HOTS development, project output types, assessment practices, and instructional integration in PjBL-based EFL learning. Overall, the findings highlight the need for more balanced HOTS-oriented task design, clearer assessment frameworks, and more consistent implementation practices.

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INTRODUCTION

Contemporary education emphasizes higher-order cognitive and transferable skills essential for 21st-century learning, including creativity, collaboration, critical thinking, and problem-solving (OECD, 2019). Learning therefore involves analyzing, evaluating, and applying knowledge,

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which align with Higher-Order Thinking Skills (HOTS) in the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001).

In Indonesia, educational transformation through the Merdeka Curriculum emphasizes meaningful, student-centered learning and promotes critical and creative thinking within the Pancasila Student Profile (Kemdikbudristek, 2024). Classroom learning is therefore expected to encourage active thinking and idea exploration, as HOTS are essential for addressing complex learning demands and real-life challenges (Brookhart, 2010).

In EFL contexts, language learning involves not only mastering grammar and vocabulary, but also communicating ideas and engaging in critical thinking (Iryani & Suryadi, 2025; Richards, 2015). However, many EFL classrooms still emphasize form-focused and teacher-centered instruction, limiting opportunities for analytical thinking development (Widodo, 2016). Consequently, students may achieve language accuracy while struggling to evaluate and analyze ideas. Therefore, HOTS are important as cognitive and social processes developed through active classroom interaction and participation (Suharno & Setyarini, 2021).

Project-Based Learning (PjBL) is a learner-centered approach encouraging collaborative and contextual learning through tangible project outcomes (Thomas, 2000). It promotes idea exchange, problem-solving, and higher-order cognitive processes (Bell, 2010). Studies show that PjBL can improve creativity, critical thinking, engagement, and language participation in EFL contexts (Guo et al., 2020; Kokotsaki et al., 2016; Setyarini et al., 2018). However, its effectiveness may vary depending on implementation, including teacher readiness, assessment consistency, classroom management, and time constraints.

Although PjBL is associated with HOTS development in EFL contexts, its implementation faces challenges such as time constraints, teacher readiness, classroom management, and assessment consistency (Lestari et al., 2025). These factors influence its effectiveness across instructional settings. Existing studies mainly emphasize critical thinking, while creativity and problem-solving receive less attention (Guo et al., 2020; Kokotsaki et al., 2016). Variations in project types, learning activities, and assessment practices also remain insufficiently synthesized, limiting comparison across studies (Brookhart, 2010). Furthermore, limited research has examined how technology-enhanced and collaborative learning integrations within PjBL contribute to different HOTS dimensions in EFL contexts (Krajcik & Blumenfeld, 2005).

These gaps indicate the need for a systematic synthesis of how PjBL supports HOTS across EFL contexts, project formats, assessment practices, and instructional integrations. Unlike previous studies, this review synthesizes patterns of HOTS development and PjBL implementation. Therefore, this study examines how PjBL supports HOTS development in EFL contexts through several research questions. To address this objective, the study investigates the following research questions:

1. What types of Higher-Order Thinking Skills are developed through PjBL in EFL contexts?

2. What types of project outputs are produced through PjBL in English language learning?
3. What assessment instruments are used to measure HOTS in PjBL studies?
4. How is PjBL integrated with other instructional approaches to support HOTS development in EFL contexts?

By addressing these questions, this review seeks to provide insights for researchers and educators in designing more meaningful and HOTS-oriented English language learning environments.

LITERATURE REVIEW

2.1. Higher-Order Thinking Skills in Language Learning

Higher-Order Thinking Skills (HOTS) involve advanced cognitive processes of analyzing, evaluating, and creating in the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001). HOTS are also viewed as cognitive processes developed through meaningful learning experiences encouraging inquiry, interaction, reflection, and idea construction (Ledema Acosta et al., 2025; Suharno & Setyarini, 2021).

In EFL contexts, HOTS develop through activities involving interpretation, evaluation, collaboration, and meaning-making (Gita Almada et al., 2022; Richards, 2015). However, many language classrooms still emphasize memorization and comprehension-oriented activities, limiting deeper cognitive engagement (Widodo, 2016). This indicates that although HOTS are important in language education, their classroom implementation remains uneven across EFL contexts.

Bloom's Taxonomy remains widely used to categorize cognitive skills, emphasizing analyzing, evaluating, and creating as core HOTS dimensions (Anderson & Krathwohl, 2001). Previous studies mainly examine analytical and evaluative skills, while creativity receives less attention. This suggests HOTS development in EFL contexts is still influenced by instructional priorities and measurable assessment practices.

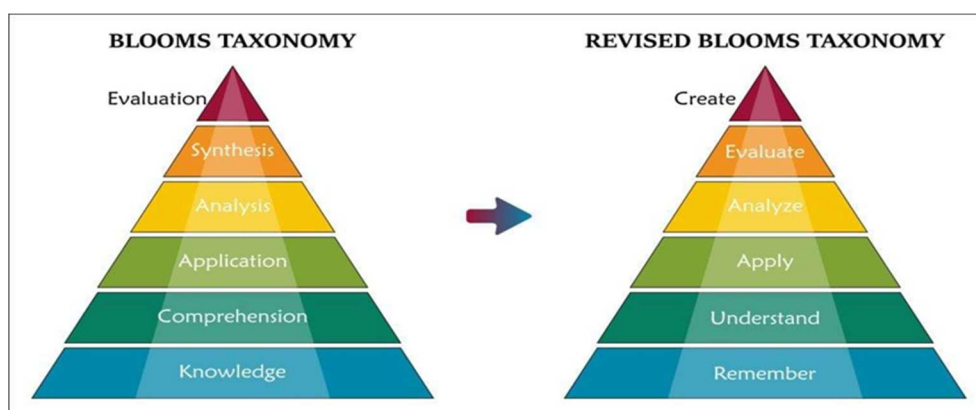


Figure 1. Revised Bloom's Taxonomy Framework (Anderson & Krathwohl, 2001).

In this review, the revised Bloom's Taxonomy serves as the conceptual framework for examining how different dimensions of HOTS are emphasized across PjBL implementation in EFL contexts.

2.2. The Use of PjBL in English Language Instruction

Project-Based Learning (PjBL) is a learner-centered approach promoting meaningful and contextual learning through collaborative, project-oriented activities (Benlaghrissi & Ouahidi, 2024; Thomas, 2000). PjBL encourages problem investigation, idea exchange, decision-making, and tangible outputs linked to higher-order cognitive processes (Bell, 2010; Murtini et al., 2025; Sholikhah, 2019), making it closely associated with HOTS development in EFL contexts.

Previous studies show that PjBL may support critical thinking, creativity, engagement, and collaborative participation in EFL contexts (Guo et al., 2020; Kokotsaki et al., 2016; Setyarini et al., 2018). However, most studies emphasize critical thinking, while creativity and problem-solving receive less attention, indicating uneven HOTS development across instructional settings and project designs (Ellah, 2025; Hamdanat et al., 2025; Purwati et al., 2024).

Previous studies reveal considerable variation in PjBL implementation across EFL contexts, including digital projects, academic writing, presentations, and creative-cultural activities. Although this diversity reflects PjBL adaptability, inconsistent project frameworks complicate comparisons of implementation and learning outcomes (Liu, 2025; Maharani & Zulkarnain, 2024; Mujiono et al., 2024). Studies also show that PjBL is often integrated with technology-enhanced, collaborative, and interdisciplinary approaches to increase engagement (Rampeng et al., 2025; Sari & Prasetyo, 2021; Siregar et al., 2023). However, limited research systematically examines how these integrations support different HOTS dimensions (Long, 2025; Tambunan et al., 2024; Tusino et al., 2024). Variations in project design, assessment, and instructional integration further complicate cross-study comparison and interpretation.

Previous studies highlight challenges in implementing PjBL, including time constraints, unequal participation, teacher readiness, classroom management, and inconsistent assessment practices. These findings suggest that PjBL effectiveness depends on instructional and contextual factors. Consequently, research continues to report varied findings regarding PjBL's support for multidimensional HOTS development in EFL contexts (Waly & Ashadi, 2024).

2.3. Research Gap and Rationale for the Study

Although previous studies increasingly examine PjBL in English learning, important gaps remain. Research frequently highlights its potential to support HOTS, especially critical thinking. However, findings are often limited to isolated contexts, making it difficult to comprehensively understand how different HOTS dimensions develop across EFL contexts.

Existing studies often focus on specific language skills or cognitive outcomes, limiting integrated understanding of how PjBL supports creativity, problem-solving, and other HOTS dimensions (Song et al., 2025; Sopiah et al., 2025; Susanti et al., 2023). Variations in project formats, instructional activities, and assessment practices further complicate

comparison, while systematic frameworks for categorizing project outputs and evaluating HOTS across studies remain limited.

Another important issue concerns integrating PjBL with technology-enhanced, collaborative, and interdisciplinary learning approaches in EFL contexts. However, limited research systematically examines how these integrations support different HOTS dimensions. Therefore, this review synthesizes HOTS development patterns, project outputs, assessment practices, and instructional integrations across EFL contexts to examine dimensions emphasized, project types, assessment instruments, and PjBL integration in English language learning.

METHOD

3.1. Research Design

This study employed a Systematic Literature Review (SLR) design to examine previous studies on the implementation of Project-Based Learning (PjBL) for developing Higher-Order Thinking Skills (HOTS) in English as a Foreign Language (EFL) contexts. A systematic review was selected because it enables researchers to identify, evaluate, and synthesize relevant empirical studies through transparent and replicable procedures. In addition, this approach facilitates the identification of research patterns, instructional trends, methodological variations, and research gaps related to PjBL and HOTS development in language learning contexts.

3.2. Search Strategy and Databases

The literature search used Google Scholar, Semantic Scholar, and ERIC databases because they provide broad coverage of educational, interdisciplinary, and EFL research related to PjBL and HOTS. Google Scholar identified diverse studies, Semantic Scholar supported citation-based article filtering and relevance, while ERIC was selected for its specialization in educational research and peer-reviewed academic publications.

Although Google Scholar and Semantic Scholar include broad sources, strict filtering selected only peer-reviewed, English-language empirical journal articles with full-text access to ensure relevance and methodological consistency. The search, conducted in March 2026, used Boolean combinations of keywords related to PjBL, HOTS, EFL, critical thinking, creativity, problem-solving, and 21st-century learning. The study focused on empirical research published between 2021-2026. Initial searches across the three databases identified 1,585 articles before screening and eligibility selection procedures were applied.

3.3. Inclusion and Exclusion Criteria

The study applied several inclusion and exclusion criteria to ensure the relevance, consistency, and quality of the selected studies. The inclusion criteria were as follows:

1. The study discussed the implementation of Project-Based Learning (PjBL) in English as a Foreign Language (EFL) or English Language Teaching (ELT) contexts.

2. The study examined the development or assessment of Higher-Order Thinking Skills (HOTS), including critical thinking, creativity, or problem-solving.
 3. The article was empirical research employing qualitative, quantitative, or mixed-methods designs.
 4. The article was published in peer-reviewed academic journals between 2021 and 2026.
 5. The article was written in English and accessible in full-text form.
- Meanwhile, the exclusion criteria included:
1. Non-empirical publications such as conceptual papers, opinion articles, editorials, literature reviews, and conference abstracts.
 2. Unpublished manuscripts, and incomplete articles.
 3. Duplicate publications identified during the screening process.
 4. Studies not directly related to PjBL implementation or HOTS development in EFL/ELT contexts.
 5. Articles with inaccessible or incomplete full-text content.

3.4. Study Selection Procedure (PRISMA)

The study selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, which consists of four main stages: identification, screening, eligibility, and inclusion. The PRISMA approach was used to ensure a transparent and systematic article selection process. During the identification stage, articles were collected from Google Scholar, Semantic Scholar, and ERIC using the predefined search keywords and Boolean operators. The initial search identified 1,585 articles. Duplicate publications were subsequently removed before the screening stage was conducted. In the screening stage, article titles and abstracts were reviewed to determine their relevance to the focus of the study, particularly the implementation of Project-Based Learning (PjBL) and the development of Higher-Order Thinking Skills (HOTS) in EFL/ELT contexts. Articles that did not meet the inclusion criteria were excluded at this stage. The remaining articles then underwent full-text eligibility assessment to evaluate their methodological relevance, research focus, and alignment with the inclusion criteria. After the eligibility process was completed, 25 empirical studies were finally included in the review. The overall article selection process is illustrated in Figure 2.

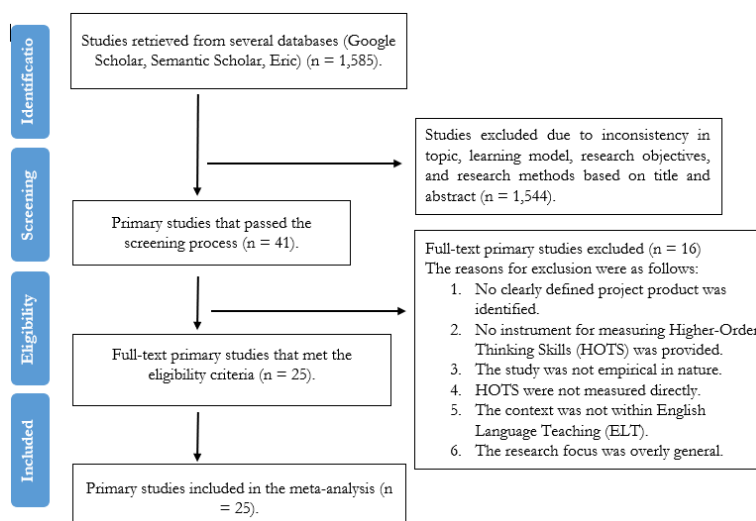


Figure 2. PRISMA flowchart of the study selection process

3.5. Data Extraction and Analysis

Data from the selected studies were extracted and analyzed using qualitative descriptive analysis. Relevant information was systematically identified and recorded from each article, including publication year, participants, research design, HOTS dimensions, project output types, assessment instruments, and the integration of PjBL with other instructional approaches. Prior to data extraction, the methodological quality of the included studies was appraised using a set of descriptive criteria adapted from common practices in systematic reviews of educational research. These criteria included the clarity of the research design, the relevance of the study to PjBL and HOTS in EFL or ELT contexts, the adequacy of the methodological reporting, including descriptions of participants, instruments, and data analysis procedures, and the transparency of the reported findings. Studies that did not provide sufficient methodological information or that did not clearly report empirical procedures were excluded during the eligibility stage. Because no formal validated quality appraisal checklist such as the CASP or the MMAT was applied, this informal approach is acknowledged as a methodological limitation of the present review.

The extracted data were subsequently coded and categorized into thematic groups based on recurring patterns identified across the studies. The analysis focused on examining how PjBL was implemented to support different dimensions of HOTS, particularly critical thinking, creativity, and problem-solving skills, as well as the types of project outputs produced, the assessment practices employed, and the instructional approaches integrated with PjBL in EFL contexts.

The coding process was conducted iteratively by repeatedly reviewing the selected studies to identify recurring themes, similarities, and variations across the findings. Initial coding categories were developed based on the research questions and refined during the analysis process as new patterns emerged from the data. To improve analytical consistency, the

categorization and interpretation of findings were re-examined through repeated comparison across studies to ensure alignment between the extracted data, thematic categories, and research objectives. The coding was initially conducted by the first author, who served as the primary coder responsible for reading the full text of each included study, extracting the relevant information, and assigning the codes to the predetermined thematic categories. To maintain analytical consistency, the coding results were then verified through repeated checking of the selected studies and through peer discussion with the co-authors, who reviewed the coded data, the assigned categories, and the resulting interpretations. Disagreements identified during the verification process were resolved through joint discussion until a shared understanding was reached. This collaborative review procedure was applied to reduce potential coder bias and to enhance the trustworthiness of the thematic categorization, although the absence of a formal inter-coder reliability index is acknowledged as a methodological limitation of this review.

The interpreted findings were then synthesized descriptively to provide a more integrated understanding of current research trends related to PjBL implementation and HOTS development in EFL contexts.

RESULTS

A total of 1,585 studies were initially identified through the March 2026 literature search conducted across three academic databases: Google Scholar, Semantic Scholar, and ERIC. After the removal of 312 duplicate records, 1,273 articles remained for the screening process. Title and abstract screening subsequently excluded 1,232 articles that were not relevant to the focus of the study. As a result, 41 articles were selected for full-text eligibility assessment. During the eligibility stage, 16 articles were excluded for several reasons, including the absence of empirical data, limited reporting of research procedures, and insufficient relevance to English language teaching contexts. Finally, 25 studies were included in the final review. The overall selection process is illustrated in the PRISMA flow diagram presented in Figure 2. To provide a general overview of the selected studies, the characteristics of the 25 included articles are presented in Table 1.

Table 1. Characteristics of the Selected Studies

Title	Year	Participants	Research Method	Country
“Application of PBL Teaching Method to Junior High School English Reading Pointing to Higher Order Thinking”	2025	Junior High School	Qualitative Research	China
“The Implementation of STEM Project-Based Learning and Critical Thinking on Student Creativity in English Learning: A Mixed Methods Study”	2025	Senior High School	Mixed Methods Research	Indonesia
“Design and Implementation of the Holistic Unit Teaching for Upper Primary School Grades	2025	Elementary School	Qualitative Research	China

English Based on Project-Based Learning”					
“Developing Students' Worksheet for English Language Teaching to Cope with the 4Cs Skill Through Project Based Learning”	2023	Senior High School	R&D	Indonesia	
“Integrating Project Based Learning (PBL) in Education 4.0 to Produce Higher Order Thinking Skills (HOTS) For Student in English Classes”	2022	Elementary School	Qualitative Research	Indonesia	
“Project-Based Learning Integrated with Higher-Order Thinking Skills (HOTS) Assessment to Enhancing Students' Speaking Skill in The EFL Classroom”	2024	Junior High School	Classroom Action Research	Indonesia	
“Effectiveness of online Project-Based Learning on Chinese EFL Learners' Critical Thinking Skills and Reading Comprehension Ability”	2025	University	Quantitative Research	China	
“Integrating Project-Based Learning and Deep Learning Principles to Foster Speaking Fluency and Critical Thinking in EFL”	2025	Senior High School	Quasi-experiment	Indonesia	
“Project-Based Learning for Academic Reading: Enhancing Higher-Order Thinking Skills in EFL Learners”	2025	University	Mixed Methods Research	Ecuador	
“Online Project-Based Learning and Critical Thinking Skills: A Case Study in Tertiary Education”	2022	University	Case Study	Indonesia	
“Project-Based Learning to Develop Teamwork and Critical Thinking Skills in The EFL Classroom”	2025	Junior High School And Senior High School	Mixed Methods Research	Morocco	
“Project-Based Learning and Group Discussion to Enhance Critical Thinking in English Language Education: A Qualitative Case Study in SMA 1 Blora”	2025	Senior High School	Qualitative Research	Indonesia	
Exploring Project-Based Learning for Enhancing Critical Thinking Skills in EFL Classrooms	2024	Senior High School	Qualitative Research	Indonesia	
“A Quasi-Experiment Study of Project-Based Learning's Influence on Critical Thinking Skill Among Moroccan EFL Undergraduates”	2025	University	Quantitative Research	Morocco	
“The Importance of Project Based Learning in Teaching	2022	Pre-University	Case Study	Kosovo	

English as a Foreign Language: A Case Study from the Republic of Kosovo”				
“Student's Perceptions of Project-Based Learning on Developing Critical Thinking and Speaking Skills”	2025	Senior High School	Qualitative Research	Indonesia
“The Impact of Mobile-Assisted Project-Based Learning on Developing EFL Students’ Speaking Skills”	2024	Junior High School	Quantitative Research	Morocco
“Integrating Design Thinking (DT) and Project-Based Learning (PjBL) with Writing Literacy for Advancing Creative, Collaborative, and Critical Writing Skills among EFL Learners”	2024	University	Quantitative Research	Indonesia
“Writing Indigenous Narratives Through Project-Based Learning: Promoting Student' Critical Thinking in an EFL Classroom”	2025	Junior High School	Qualitative Research	Indonesia
“Unleashing the potentials: Nurturing Student's 4Cs Skills through Project-Based Learning with ICT in EFL Classrooms”	2024	Senior High School	Qualitative Research	Indonesia
“The Impact of Project-Based Learning on Collaborative and Critical Thinking Skills of Students in Translation Course”	2024	University	Quantitative Research	Indonesia
“Hyflex Project-Based Learning and Students' High Order Thinking Skills: Its Impact and Relevance”	2024	University	Qualitative Research	Indonesia
“Speaking Skill and Critical Thinking Skill Development Through Project Based Learning Method of EFL Tertiary Students”	2021	University	Classroom Action Research	Indonesia
“The Effects of Learning- Supported Project-Based Learning on EFL Learners' Critical Thinking in Indonesia”	2024	University	Quantitative Research	Indonesia
“Project-Based Learning on Critical Reading Course to Enhance Critical Thinking Skills”	2021	University	Mixed Methods Research	Indonesia

The review indicates that studies examining the implementation of Project-Based Learning (PjBL) for fostering Higher-Order Thinking Skills (HOTS) in English language learning have been conducted across diverse educational levels, methodological approaches, and geographical contexts.

In terms of participants, most studies were conducted at the secondary and higher education levels, particularly in senior high schools and universities, while fewer studies focused on primary school and pre-

university contexts. This pattern suggests that the implementation of PjBL for HOTS development is more commonly emphasized in secondary and tertiary education settings, where learners are generally expected to engage in more complex analytical, communicative, and project-oriented learning activities.

Regarding research methodology, the reviewed studies employed a wide range of approaches, including qualitative research, quantitative research, mixed-methods studies, quasi-experimental designs, classroom action research (CAR), research and development (R&D), and case studies. Among these approaches, qualitative and quantitative methods appeared most frequently. This diversity indicates that research on PjBL and HOTS not only explores classroom implementation practices, but also attempts to examine instructional effectiveness through empirical investigation and contextual learning analysis.

Geographically, the majority of studies were conducted in Indonesia, followed by China, Morocco, Ecuador, and Kosovo. The dominance of Indonesian studies may reflect the growing interest in implementing PjBL within EFL instruction, particularly in relation to current educational reforms emphasizing Higher-Order Thinking Skills and 21st-century learning competencies.

4.1. Types of Higher-Order Thinking Skills Developed

This section presents the types of Higher-Order Thinking Skills (HOTS) identified across the reviewed studies. The analysis focuses on the dominant HOTS dimensions emphasized in Project-Based Learning (PjBL) implementations within EFL contexts. The distribution of HOTS dimensions identified in the selected studies is presented in Table 2. It should be noted that the HOTS categories presented in Table 2 are not mutually exclusive. A single study could be coded under more than one HOTS category when it explicitly addressed multiple dimensions, such as critical thinking together with creativity or problem-solving. For this reason, the reported percentages reflect the frequency with which each HOTS dimension was emphasized across the reviewed studies rather than the proportion of studies addressing only one dimension, and the total exceeds 100%.

Table 2. Distribution of Advanced Thinking Components in PjBL Studies

Skill Category	Skill Type	Percentage
HOTS (Specific)	Critical Thinking	72%
	Creativity	28%
	Problem Solving	20%
HOTS (Non-Specific)	HOTS	16%
HOTS (Extended/Variation)	Critical Evaluation, Creativity Imagination, Thinking Skill, and Critical Writing	16%
21 st Century Skill	Collaboration	20%
	Communication	8%
	Decision Making	12%

The results show that critical thinking was the most dominant skill category, appearing in 18 articles (72%). This finding suggests that most PjBL studies in EFL contexts primarily focus on developing learners' ability

to interpret information, evaluate ideas, and construct arguments during language learning activities. The dominance of critical thinking may also indicate that analytical and evaluative skills are more frequently emphasized in classroom instruction and assessment practices. This finding is also consistent with previous discussions in EFL research suggesting that critical thinking is often prioritized because analytical and evaluative skills are more easily incorporated into classroom assessment and performance-based instructional activities.

Creativity was identified in 7 articles (28%), indicating that PjBL also supports idea generation, imagination, and creative expression through activities such as multimedia production, storytelling, and project design. However, compared to critical thinking, creativity appeared less consistently emphasized across the reviewed studies. This pattern may suggest that creative dimensions of HOTS are more dependent on instructional flexibility and project design, which may vary considerably across EFL learning environments.

Meanwhile, problem-solving skills appeared in 5 articles (20%), indicating that some studies emphasized learners' competence in recognizing and addressing problems through project-based tasks. Although problem-solving emerged as an important component of HOTS development, it was discussed less systematically in the reviewed literature. This finding may indicate that problem-solving activities in EFL contexts are often integrated implicitly within project tasks rather than explicitly conceptualized as independent learning objectives.

Furthermore, several studies referred to HOTS in more general terms without specifying particular skill categories. These were categorized as non-specific HOTS and were identified in 4 articles (16%). Similarly, extended HOTS variations such as critical evaluation, creative imagination, thinking skills, and critical writing were also found in 4 articles (16%). This variation indicates that conceptualizations of HOTS still differ across studies and instructional contexts, particularly regarding how higher-order cognitive processes are defined and operationalized in language learning environments.

Beyond HOTS dimensions, several studies also reported the development of broader 21st-century skills. Collaboration appeared in 5 articles (20%), decision-making in 3 articles (12%), and communication in 2 articles (8%). These findings suggest that PjBL implementation in EFL contexts is often associated not only with cognitive skill development, but also with collaborative and communicative learning practices that support more interactive and student-centered learning environments.

4.2. Forms of Outputs Produced Through PjBL

To explore the forms of student products generated through the PjBL approach, the project outputs identified across the reviewed studies were categorized into several types, as illustrated in Figure 3.

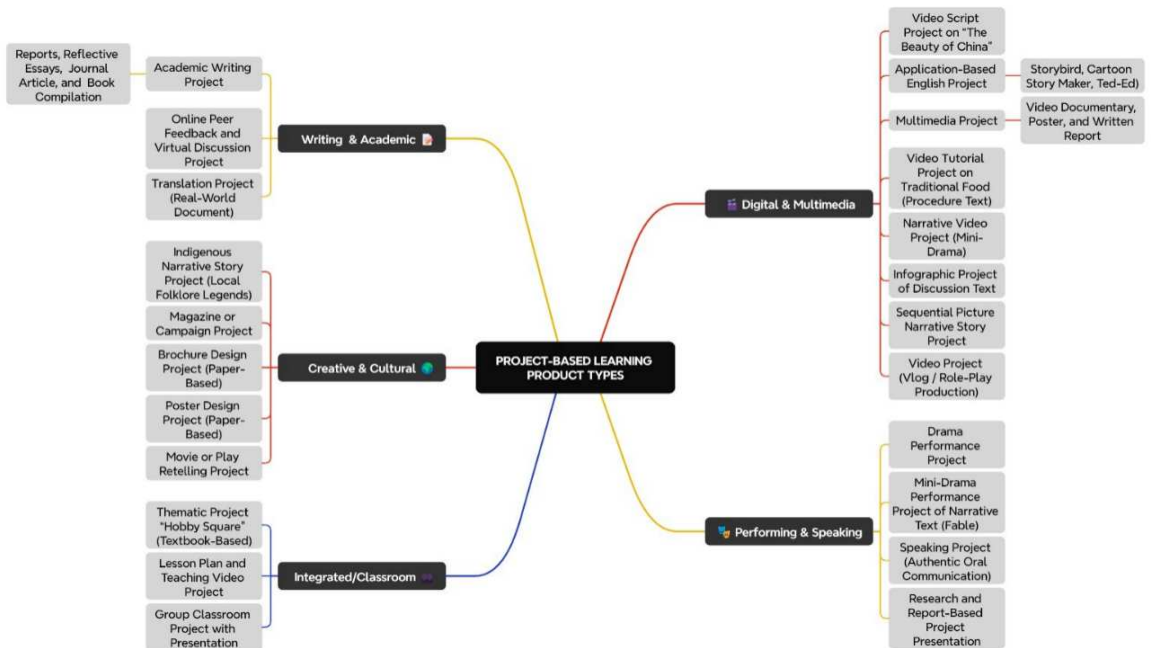


Figure 3. Types of Project-Based Learning Outputs

The analysis identified several categories of project outputs developed through PjBL implementation in EFL contexts, including digital and multimedia projects, performance-based projects, academic writing projects, creative-cultural projects, and integrated classroom projects. This variation suggests that PjBL provides opportunities for students to engage in diverse forms of language production and higher-order thinking activities.

Among the identified outputs, digital and multimedia projects appeared most frequently, reflecting the growing integration of digital literacy and technology-enhanced learning practices in contemporary EFL contexts. Across the reviewed studies, performance-based projects and academic writing activities were also commonly implemented to support communicative competence, analytical thinking, and evaluative language use.

Several reviewed studies additionally implemented creative-cultural and integrated classroom projects, indicating that PjBL may facilitate broader learning experiences involving cognitive, communicative, collaborative, and creative skills simultaneously. Overall, the findings suggest that project outputs in PjBL implementations vary considerably across EFL contexts. Although this diversity demonstrates the adaptability of PjBL to different instructional needs and classroom situations, the absence of more standardized frameworks for categorizing project outputs may create challenges for comparing implementation patterns and evaluating learning outcomes consistently across studies.

4.3. Assessment Instruments Used to Measure HOTS

This section presents the assessment instruments identified across the reviewed studies to evaluate students' HOTS development and Project-Based Learning performance in EFL contexts. The analysis focuses on how different assessment tools were implemented to assess cognitive, communicative, collaborative, and creative learning outcomes. The distribution of assessment instruments identified in the selected studies is illustrated in Figure 4.

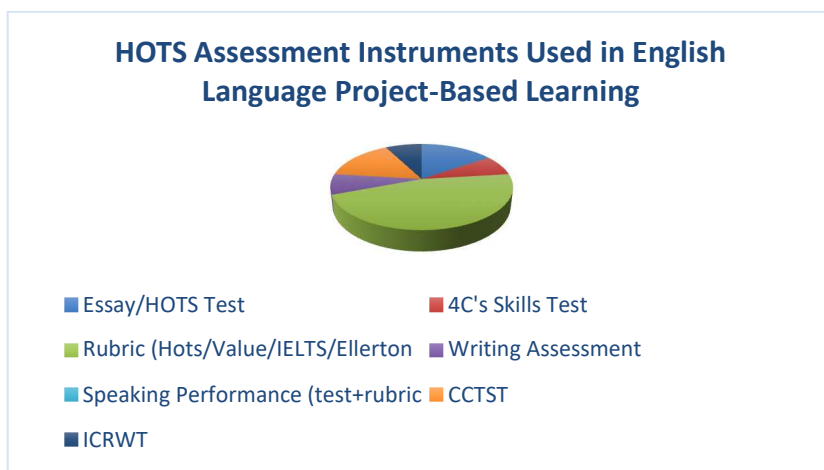


Figure 4. HOTS Assessment Instruments Used in PjBL

The findings show that a wide range of assessment instruments was employed across the reviewed PjBL studies, including rubrics, observation-based instruments, questionnaires, tests, reflective journals, and peer or self-assessment tools. This variation suggests that assessment practices in PjBL implementations tend to emphasize authentic and process-oriented evaluation rather than relying solely on traditional testing methods.

Among the identified instruments, rubrics appeared most frequently and were commonly used to assess project performance, critical thinking, creativity, collaboration, and presentation skills. This finding indicates that many reviewed studies considered performance-based assessment more suitable for evaluating multidimensional learning outcomes developed through PjBL activities.

Several reviewed studies additionally employed observation-based, reflective, and questionnaire-based assessment instruments to evaluate participation, engagement, collaboration, and HOTS development during project activities. Peer assessment and self-assessment practices were also identified in some studies, suggesting attempts to encourage learner autonomy, collaborative evaluation, and reflective learning processes.

Overall, The findings suggest that assessment practices in PjBL implementations remain highly varied across EFL contexts. The considerable variation in assessment practices suggests that the evaluation of HOTS in PjBL contexts remains methodologically inconsistent, which may complicate efforts to compare learning outcomes across studies and instructional settings.

4.4. Integration of PjBL with Other Instructional Approaches

This section presents the instructional approaches integrated with Project-Based Learning (PjBL) across the reviewed studies. The analysis focuses on how different pedagogical approaches were combined with PjBL to support HOTS development and English language learning outcomes in EFL contexts. The variation of integrated instructional approaches identified in the selected studies is illustrated in Figure 5.

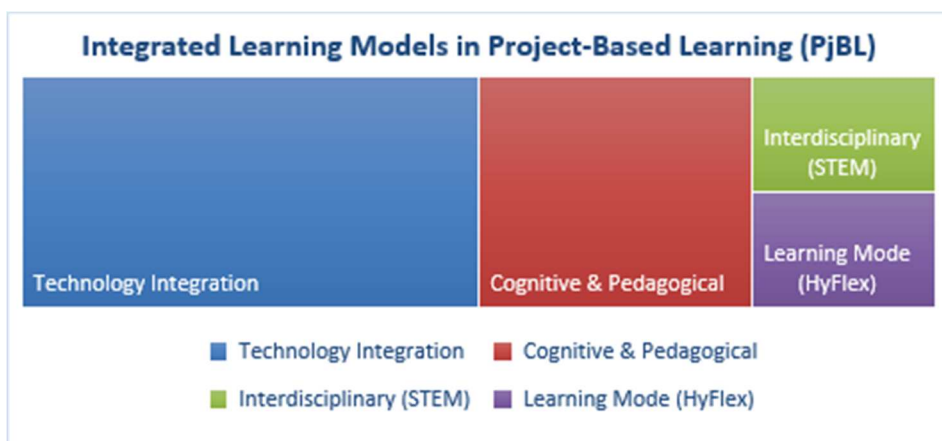


Figure 5. Integration Models in Project-Based Learning

The findings show that PjBL was integrated with various instructional approaches across the reviewed studies, particularly technology-enhanced, collaborative, inquiry-based, and blended learning approaches. This variation suggests that PjBL is frequently adapted to different pedagogical needs and classroom contexts in EFL learning environments. Among the identified approaches, technology-integrated learning appeared most frequently, reflecting the growing emphasis on digital learning environments and 21st-century educational practices. This trend reflects the increasing demand for digitally mediated and interactive language learning environments in contemporary EFL contexts.

Several reviewed studies also combined PjBL with collaborative, inquiry-based, contextual, and blended learning approaches to support active participation, problem-solving, interaction, and learner engagement during project activities. These integrations suggest that PjBL is commonly implemented as a flexible instructional approach capable of supporting multiple learning objectives simultaneously. Overall, the findings indicate that integrating PjBL with multiple instructional approaches may support more interactive and adaptable learning experiences in EFL contexts. However, the considerable variation across studies also suggests the absence of more consistent frameworks for integrating PjBL with other instructional approaches in language learning environments.

DISCUSSION

The findings of this review suggest that Project-Based Learning (PjBL) is frequently associated with the development of Higher-Order

Thinking Skills (HOTS) in EFL learning environments, particularly critical thinking skills. The dominance of critical thinking across the reviewed studies may reflect the tendency of many PjBL implementations to prioritize analytical and evaluative learning activities through collaborative projects, authentic tasks, and inquiry-based processes. This finding is consistent with learner-centered PjBL principles emphasizing active participation, contextual learning experiences, collaborative inquiry, and meaningful knowledge construction throughout the learning process (Bell, 2010; Thomas, 2000). The stronger emphasis on critical thinking also reflects the hierarchical structure of the revised Bloom's Taxonomy, in which analytical and evaluative processes are more frequently operationalized in classroom instruction and assessment compared to more open-ended creative processes (Anderson & Krathwohl, 2001). The uneven emphasis on different HOTS dimensions across the reviewed studies may additionally reflect broader instructional and assessment tendencies in EFL education, where analytical performance is often more explicitly evaluated than creativity or open-ended problem-solving processes. Compared to critical thinking, creativity and problem-solving appeared less consistently emphasized, which may indicate that these dimensions require more flexible project design, classroom facilitation, and instructional support. Several interrelated factors may help explain why critical thinking appears more dominant than creativity and problem-solving in the reviewed studies. First, critical thinking is generally easier to operationalize and measure in EFL classroom research, as it can be observed through analytical writing, argumentation, reading responses, and structured discussion tasks that align well with conventional rubrics and language assessment practices. Second, current EFL curricula in many of the contexts represented in the reviewed studies, including Indonesia, place strong emphasis on critical thinking as part of the Pancasila Student Profile, the Merdeka Curriculum, and broader 21st-century learning frameworks, which may direct teachers' instructional focus toward analytical and evaluative competencies. Third, teacher readiness and pedagogical familiarity may also play a role, as facilitating creativity and open-ended problem-solving generally requires more flexible task design, divergent assessment strategies, and tolerance for unpredictable learning outcomes, which may be more demanding to implement and to evaluate in time-constrained EFL classrooms. Taken together, these factors suggest that the stronger emphasis on critical thinking may not necessarily indicate that PjBL is inherently less suitable for developing creativity and problem-solving, but rather that the assessment convenience, curricular priorities, and instructional readiness in the reviewed contexts may favor the cultivation and reporting of analytical thinking outcomes.

The review also indicates that PjBL implementation in EFL contexts is closely associated with active and project-oriented language learning practices. Through project-based activities, students are encouraged to use language actively while negotiating ideas, evaluating information, and solving problems collaboratively. This pattern suggests that PjBL may support broader language learning processes beyond language accuracy alone. In addition, the diversity of project outputs, assessment instruments,

and instructional integrations identified across the reviewed studies demonstrates the adaptability of PjBL to different pedagogical objectives and classroom contexts. However, the considerable variation across studies also indicates the absence of more standardized frameworks for categorizing project outputs, evaluating HOTS dimensions, and implementing PjBL consistently across EFL contexts.

These findings have several implications for English language teaching practice. The reviewed studies suggest that EFL teachers may need to design more balanced project-based activities integrating creativity, problem-solving, collaboration, and reflective learning alongside analytical language tasks. In addition, greater attention may be required in developing assessment practices capable of evaluating HOTS development more consistently across PjBL environments. The widespread use of rubrics, reflective journals, and peer assessment practices across the reviewed studies also reflects the growing emphasis on authentic assessment approaches prioritizing process-oriented and performance-based evaluation (Brookhart, 2010). These findings suggest that assessment in PjBL environments may require more flexible evaluation frameworks to capture both cognitive processes and learning products effectively.

Several implementation challenges were additionally identified across the reviewed studies, including limited instructional time, unequal student participation, technological constraints, and difficulties in assessing multidimensional HOTS development. These challenges indicate that the effectiveness of PjBL may depend not only on instructional design, but also on teacher preparedness, institutional support, technological access, and classroom management strategies. Therefore, although PjBL demonstrates considerable potential for supporting HOTS development in EFL contexts, effective implementation appears to require careful planning, contextual adaptation, and appropriate assessment practices rather than relying solely on project activities themselves.

By synthesizing patterns across project outputs, assessment practices, and instructional integrations, this review contributes to a more comprehensive understanding of how PjBL has been implemented to support multidimensional HOTS development in EFL contexts. The review also highlights the continuing imbalance between different HOTS dimensions, particularly the stronger emphasis on critical thinking compared to creativity and problem-solving across previous studies. This pattern may indicate the continuing dominance of measurable analytical outcomes in classroom instruction and assessment practices. Consequently, future PjBL implementations may require more deliberate instructional strategies to support broader and more balanced higher-order cognitive development.

This review also has several limitations that should be acknowledged. The study relied primarily on articles indexed in Google Scholar, Semantic Scholar, and ERIC, which may have limited the inclusion of relevant studies from other academic databases. In particular, the absence of major citation databases such as Scopus and Web of Science may have restricted the representativeness and international coverage of the reviewed

literature, since several highly indexed empirical studies on PjBL and HOTS in EFL contexts are primarily catalogued in those databases. Consequently, the synthesis presented in this review should be interpreted as reflecting the patterns identified across the selected open-access and educationally focused databases rather than as an exhaustive account of the global research landscape on PjBL and HOTS in EFL contexts. In addition, the article selection process may contain potential bias due to language restrictions, inclusion criteria, publication accessibility, and variations in reporting quality across studies. The reviewed studies also demonstrated considerable differences in research design, project categorization, instructional implementation, and assessment procedures, making cross-study comparison challenging. Furthermore, the absence of more standardized frameworks for categorizing HOTS dimensions and project outputs across studies may have influenced the consistency of the synthesis process. Therefore, interpretations of the findings should be considered within the methodological and contextual limitations of the reviewed studies rather than generalized universally across all EFL learning environments.

These limitations indicate the need for future research employing broader database coverage, more standardized analytical frameworks, and more consistent reporting practices regarding PjBL and HOTS development in EFL contexts. Future studies may also examine how different project designs, assessment models, and instructional integrations contribute to specific dimensions of HOTS development across diverse language learning settings.

CONCLUSION

This systematic literature review suggests that Project-Based Learning (PjBL) is frequently associated with the development of Higher-Order Thinking Skills (HOTS) in EFL contexts through collaborative, contextual, and student-centered learning practices. The reviewed studies indicate that PjBL implementation has been adapted across diverse project formats, assessment practices, and instructional integrations, reflecting its flexibility in supporting multidimensional language learning. However, the review also reveals continuing inconsistencies in the emphasis on different HOTS dimensions, assessment procedures, and instructional implementation across studies.

By synthesizing patterns related to HOTS development, project outputs, assessment practices, and instructional integration, this review contributes to a more comprehensive understanding of how PjBL has been implemented in EFL learning environments. The findings suggest that more balanced project design and more consistent HOTS-oriented assessment frameworks may be needed to support broader higher-order cognitive development in language learning contexts.

This review is limited by the selection of databases, potential article selection bias, and variations in reporting quality and methodological approaches across the reviewed studies. Therefore, the findings should be interpreted within the contextual and methodological limitations of the

selected literature. Future research is recommended to employ broader database coverage, more standardized analytical frameworks, and more context-sensitive investigations regarding how different PjBL designs and assessment models support multidimensional HOTS development across diverse EFL learning environments.

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AUTHOR CONTRIBUTION STATEMENT

N conceived the study, designed the systematic review protocol, conducted the literature search, screened the studies, performed the coding and thematic analysis, and drafted the manuscript. SS supervised the research process, provided critical guidance on the conceptual framework and methodological design, and contributed to the interpretation of the findings as well as the revision of the manuscript. IN contributed to the refinement of the research questions, validated the thematic categorization and the synthesis of the results, and reviewed the manuscript for academic clarity and coherence. All authors reviewed and approved the final version of the manuscript.

AI DISCLOSURE STATEMENT

The authors declare that AI-assisted tools were used in a limited capacity during the preparation of this manuscript, specifically for language polishing and editorial refinement. All substantive content, analysis, interpretation, and conclusions were developed independently by the authors.

COMPETING INTERESTS STATEMENT

The authors declare no competing interests relevant to the content of this manuscript.

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