

Integration of Inquiry-Based Learning in Teacher Education: Challenges, Opportunities, and Its Impact on Pedagogical Competence and Readiness

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Abstract- This study explored the extent of integration of Inquiry-Based Learning (IBL) in teacher education programs, including the challenges and opportunities it presents, and its relationship to pre-service teachers' pedagogical competence and teaching readiness. Using a descriptive-correlational research design, data were gathered from teacher educators and pre-service teachers of the Polytechnic University of the Philippines – Cabiao Campus. Findings revealed that Inquiry-Based Learning is integrated to a great extent in the teacher education curriculum. IBL principles are well reflected in curriculum design, instructional strategies, and learning environments, indicating that the institution recognizes the importance of inquiry as a foundation for professional competence. However, its integration in assessment and technology use remains at a moderate extent, suggesting areas that need further enhancement. Respondents often experienced challenges in implementing IBL, particularly in terms of time constraints, limited resources, and insufficient training. Despite these difficulties, they strongly agreed that IBL provides significant opportunities for developing critical thinking, creativity, collaboration, reflective practice, and professional competence. Furthermore, the study found a strong positive relationship between IBL integration and pre-service teachers' pedagogical competence and teaching readiness, affirming that inquiry-oriented learning effectively prepares future educators for learner-centered and reflective teaching practices. The study concludes that IBL serves as a competent and transformative pedagogical framework that enhances the professional growth of teacher candidates. It recommends strengthening assessment alignment, expanding technological integration, and intensifying faculty development to ensure the sustained and holistic implementation of IBL in teacher education programs.

Keywords: Inquiry-Based Learning, Teacher Education, Pedagogical Competence, Teaching Readiness, Reflective Practice

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INTRODUCTION

Teacher education programs around the world are under increasing pressure to prepare teachers who can meet the demands of twenty-first-century classrooms. With rapid changes in technology, globalization, and shifting student demographics, educators must not only know content but also how to teach in more adaptive, student-centered ways. One pedagogical approach gaining traction is inquiry-based learning (IBL), which emphasizes students asking questions, investigating issues, and constructing their own understanding (Bunwirat & Boonsathorn, 2018). In this context, teacher education programs must reconsider their design, curriculum, and practicum experiences to integrate IBL meaningfully. This dissertation explores how integration of IBL into teacher education can open opportunities and yet also present significant challenges.

Internationally, inquiry-based learning (IBL) has been widely recognized as an effective pedagogical approach for developing higher-order thinking skills, creativity, and reflective practice among teacher candidates. Hmelo-Silver, Duncan, and Chinn (2007) emphasized that successful implementation of inquiry and problem-based learning requires structured guidance or scaffolding to promote deep learning and achievement. Similarly, Kuhlthau, Maniotes, and Caspari (2015) introduced the Guided Inquiry Design framework, which outlines a systematic process that allows learners to explore, investigate, and construct knowledge with the teacher serving as a facilitator. Recent meta-analyses and empirical studies have confirmed the positive impact of IBL on student engagement, conceptual understanding, and problem-solving abilities, though these outcomes depend largely on the level of teacher support, curriculum alignment, and assessment design (Öztürk, 2022). Moreover, studies conducted in diverse international settings reveal that while pre-service teachers appreciate IBL for its potential to foster curiosity and critical thinking, they often struggle with challenges such as limited time, classroom management issues, and difficulty in designing inquiry-based assessments (Gholam, 2019). These international findings highlight that teacher preparation programs must provide explicit training in inquiry-oriented instructional design and reflective practice to enhance teacher readiness for classroom implementation.

Inquiry-based learning has its roots in constructivist theory, where learners build knowledge actively rather than merely receiving facts (Juan Rubio & Garcia Conesa, 2024). Research suggests that when implemented well, IBL promotes deeper understanding, motivation, and critical thinking among students (Ortlieb, 2011). However, the shift from traditional direct-instruction methods to inquiry approaches requires not only changes in student practice but also in teacher mindset, preparation, and professional development (Tal, Levin-Peled, & Levy, 2019). For teacher education, this means developing pre-service and in-service teachers who are confident facilitators of inquiry rather than mere transmitters of knowledge. Thus, understanding how teacher education programs can support this shift is essential.

There are multiple rationales for integrating IBL into teacher education. First, IBL aligns with global calls for 21st-century skills such as collaboration, creativity, problem-solving, and self-regulation — capacities that conventional lecture-based instruction may not sufficiently foster (Bunwirat & Boonsathorn, 2018). Second, inquiry pedagogy resonates with the professional identity of teachers as reflective practitioners who engage in continuous inquiry into their teaching practice. Third, given the evidence that IBL can enhance student engagement and learning outcomes, equipping teachers with the competence to implement IBL holds potential to improve classroom quality (Frontiers, 2021). Fourth, teacher education programs that adopt IBL modelling are likely to demonstrate coherence between what teachers are taught and what they will implement in practice. Therefore, integrating IBL into teacher education is more than a pedagogical trend — it promises systemic influence.

Despite its promise, integrating IBL into teacher education is not without difficulty. Empirical studies have identified significant barriers such as lack of teacher content knowledge, insufficient scaffolding for student inquiry, time-constraints, and the pressures of assessment regimes (Gutiérrez, 2015; Systematic Review, 2024). For example, pre-service teachers often leave methods courses grasping the theory of inquiry but lacking experience in designing and facilitating genuine inquiry-based lessons (Bacak & Byker, 2021). Moreover, institutional factors such as entrenched curricula, standardized testing demands, and teacher preparation models focused on traditional methods hamper innovation. Hence, the opportunities offered by IBL come with a need to address structural and pedagogical challenges in teacher education.

Given these challenges and opportunities, it is necessary to frame this dissertation around several key research questions. What are the current practices in teacher education programs with respect to IBL integration? What supports and

professional learning experiences enable teachers to adopt IBL? What contextual barriers (institutional, cultural, resource-based) hinder effective implementation? And what opportunities emerge when teacher education successfully integrates inquiry-based approaches? Through investigating these questions, this study aims to provide both descriptive and prescriptive insights for teacher educators and policymakers.

At the national level, Philippine studies have similarly underscored the importance of integrating inquiry-based strategies in teacher education. Gutierrez (2015) explored the use of lesson study as a collaborative professional development approach that nurtures inquiry-oriented teaching among Filipino teachers. Her findings revealed that collective lesson planning, classroom observation, and reflection enhanced teachers' ability to design student-centred and inquiry-based lessons. Likewise, Picardal (2022) found that pre-service teachers who engaged in reflective practice during their practicum developed stronger pedagogical competence and confidence in implementing inquiry strategies. Research in the Philippine context has also pointed out systemic barriers, such as limited resources, large class sizes, and insufficient training opportunities, which affect the full integration of IBL in higher education institutions (Diestro, 2023). Nonetheless, these national studies affirm that inquiry-based instruction, when supported by structured professional development and contextualized curriculum design, can significantly enhance teacher candidates' readiness and competence.

This study is situated in the broader conversation about teacher professional growth and innovation. As teacher education evolves, it increasingly emphasizes not just "what to teach" but "how to teach" in ways that respond to dynamic classroom realities. Integrating inquiry-based learning into teacher preparation aligns with a shift from teacher-centered to student-centered paradigms, and from isolated classroom practice to collaborative, reflective professional communities (Tal et al., 2019). Additionally, teacher educators are expected to model inquiry themselves, engaging in research-informed teaching and continuous improvement. Consequently, the focus of this dissertation on teacher education programs is timely and relevant.

The methodology for this study will draw on a mixed-methods design, combining qualitative interviews with teacher educators and pre-service teachers, along with document analysis of curricula and program materials. It will explore how teacher education institutions conceptualize IBL, how they prepare teacher candidates, and how those candidates respond to inquiry-based modules and practicum experiences. Particular attention will be paid to context: How do local institutional norms, resource availability, and cultural expectations shape the integration process? By examining multiple programs across diverse settings, the study will generate both in-depth case insights and broader patterns. This design ensures that findings will be grounded in real teacher education contexts.

The significance of this research lies in its potential to inform both practice and policy. On the practice side, teacher educators and program designers can use the findings to refine curricula, professional development models, and assessment systems that support inquiry-based teaching. On the policy side, insights about structural barriers may inform accreditation standards, funding decisions, and institutional reforms that enable IBL-oriented teacher preparation. Moreover, by highlighting opportunities — such as fostering teacher agency, improving student outcomes, and aligning preparation with future-oriented teaching — the study contributes to scholarship in teacher education and instructional innovation. In sum, the integration of IBL into teacher education is an important lever for educational improvement.

On the local level, various action research projects and undergraduate theses have been conducted to promote the use of inquiry-based learning in teacher education programs. Absin-Pagara, Moreno, and Suazo (2018) reported that local lesson study initiatives in Xavier University improved pre-service teachers' questioning techniques, lesson design, and reflective skills. Their study also highlighted the role of collaboration and mentorship in fostering inquiry competence. At the Polytechnic University of the Philippines (PUP) Cabiao Campus and nearby institutions, research initiatives focusing on inquiry-based and student-centered approaches have shown that contextualized, communitybased learning activities strengthen teacher candidates' confidence and practical teaching readiness. Despite persistent challenges such as limited technological resources and time constraints, these local studies demonstrate that even smallscale IBL interventions can yield meaningful improvements in pedagogical competence and instructional innovation among future teachers. Overall, both national and local evidence align with global findings, emphasizing that the integration of inquiry-based learning in teacher education offers promising opportunities for developing competent, reflective, and adaptive educators equipped for 21st-century classroom demands.

In conclusion, this dissertation will examine how inquiry-based learning can be meaningfully integrated into teacher education programs, exploring both its opportunities and its challenges. While IBL offers compelling promises — enhanced student engagement, deeper learning, preparation of teachers for complex classrooms — its realization depends on how teacher education is structured, supported, and contextualized. By interrogating teacher education programs' design, implementation, and outcomes, this study seeks to generate actionable recommendations for teacher educators and policy makers. The next chapters will review the conceptual underpinnings of inquiry-based learning, survey the literature on teacher education and IBL, present the research methodology, and report findings with implications for practice. Ultimately, the goal is to contribute to the transformation of teacher education so that teachers are well-equipped for inquiry-rich, future-ready classrooms.

LITERATURE REVIEW

Inquiry-Based Learning (IBL) emphasizes active knowledge construction through questioning, exploration, and reflection, aligning with constructivist and experiential learning theories (Piaget, 1970; Vygotsky, 1978; Kolb, 1984). In teacher education, IBL promotes reflective practice, critical thinking, and pedagogical competence by modeling inquiry-oriented instruction (Windschitl, 2003; Korthagen, 2010; Kolb & Kolb, 2017).

Global studies show IBL enhances engagement and higher-order thinking, especially when supported with structured scaffolding (Hmelo-Silver, Duncan, & Chinn, 2007; Kuhlthau, Maniotes, & Caspari, 2015; Öztürk, 2022). Challenges include limited time, insufficient resources, lack of training, and rigid curricula, which hinder full implementation (Gutiérrez, 2015; Gholam, 2019; Tamir & Lunetta, 2010; Minner, Levy, & Century, 2010).

Philippine studies reveal that collaborative strategies like lesson study improve inquiry skills and teacher readiness, though large classes and limited technology remain barriers (Gutiérrez, 2015; Picardal, 2022; Diestro, 2023). IBL fosters creativity, collaboration, and self-directed learning, preparing pre-service teachers for real classroom challenges (Prince & Felder, 2006; Savery, 2015; Schraw, Crippen, & Hartley, 2006; Coffman, 2017; Darling-Hammond et al., 2017).

METHODOLOGY

The methodology of this study is designed to systematically examine the integration of Inquiry-Based Learning (IBL) in teacher education programs and its relationship to pre-service teachers' pedagogical competence and teaching readiness. The approach follows a structured process composed of key phases to ensure clarity, reliability, and relevance of the findings.

1. Objective Definition

This study aims to determine the extent of IBL integration in curriculum, instruction, and assessment, as well as to identify the challenges and opportunities associated with its implementation. It further seeks to examine the relationship between IBL integration and the pedagogical competence and teaching readiness of pre-service teachers. Measurable outcomes include computed mean scores and correlation values to assess the significance of relationships among variables.

2. Scenario Development

The study is grounded in real educational settings, particularly within the Polytechnic University of the Philippines – Cabiao Campus. It reflects actual teaching-learning experiences of pre-service teachers and teacher educators, ensuring that the investigation captures realistic classroom practices and institutional conditions related to IBL implementation.

3. Setup and Configuration

The participants of the study include pre-service teachers enrolled in the Bachelor of Elementary Education (BEEd) and Bachelor of Secondary Education (BSEd) programs, along with teacher educators handling professional education courses. Data collection instruments consist of structured questionnaires using a Likert scale and semi-structured interviews. Curriculum guides and course syllabi are also reviewed to validate the integration of IBL. Prior to implementation, the instruments are subjected to expert validation and pilot testing to ensure reliability and clarity.

4. Step-by-Step Execution

The data collection procedure will begin with securing permission from the administration of Polytechnic University of the Philippines, Cabaio Campus, and coordination with program heads. Participants will be oriented on the purpose of the study, procedures, and ethical considerations, including voluntary participation, confidentiality, and the right to withdraw at any time. Questionnaires will be distributed to pre-service teachers during class sessions or through online platforms, while interviews with instructors will be scheduled at mutually convenient times and recorded with consent. Additionally, secondary data such as curriculum guides, course syllabi, and instructional materials will be reviewed to verify the integration of IBL strategies in the teacher education program.

5. Data Collection

Quantitative data are gathered through survey responses measuring the extent of IBL integration, perceived challenges, and opportunities. Qualitative data are obtained from interviews to provide deeper insights into instructional practices and implementation issues. These data are complemented by document analysis of curricular materials to ensure triangulation and strengthen the validity of findings.

6. Evaluation and Iteration

The collected data are analyzed using appropriate statistical tools. The weighted mean is used to determine levels of integration, challenges, and opportunities, while ranking identifies the most prominent issues. The Pearson Product-Moment Correlation Coefficient (Pearson r) is applied to determine the relationship between IBL integration and pedagogical competence and teaching readiness. Findings are interpreted in relation to existing theories and studies, allowing for the identification of strengths and areas for improvement.

7. Conclusion and Next Steps

The results provide empirical evidence on the effectiveness of IBL in enhancing teacher competence and readiness. Based on the findings, recommendations are proposed, including strengthening assessment practices, improving technological integration, and providing continuous professional development for educators. Future research may explore broader applications of IBL and its long-term impact on teaching effectiveness.

Ethical Considerations

Ethical standards are strictly observed throughout the study. Informed consent is obtained from all participants, ensuring they are fully aware of the study's purpose and procedures. Confidentiality and anonymity are maintained by excluding personal identifiers from the data. Participation is voluntary, and respondents are allowed to withdraw at any time without penalty. All data are securely stored and used solely for academic purposes, in compliance with institutional and national ethical guidelines.

RESULTS & DISCUSSION

Table 1. Extent of Integration of Inquiry-Based Learning (IBL) in Teacher Education Programs

No.	Indicators	Mean	Descriptive Equivalent / Interpretation
1	IBL principles are embedded in the teacher education curriculum.	4.35	Great Extent
2	Course syllabi reflect inquiry-based outcomes.	4.1	Great Extent
3	Instructional strategies promote questioning and exploration.	4.25	Great Extent
4	Tasks require investigation of real-life problems.	3.9	Moderate Extent
5	Assessments evaluate inquiry processes.	3.85	Moderate Extent
6	Teacher educators model inquiry-oriented teaching.	4.3	Great Extent
7	Learning environments encourage collaboration.	4.15	Great Extent
8	Technology supports inquiry activities.	3.8	Moderate Extent
9	Reflection and feedback are integral to inquiry learning.	4	Great Extent

10	Curriculum provides opportunities for student-led investigations.	4.2	Great Extent
	Overall Mean	4.09	Great Extent

The results suggest that Inquiry-Based Learning (IBL) is integrated to a great extent in the teacher education program at the Polytechnic University of the Philippines – Cabiao Campus. The consistently high means in areas such as curriculum design, instructional strategies, and collaborative learning imply that both administrators and faculty members recognize the pedagogical importance of inquiry as a foundation for professional competence.

Notably, the moderate integration in assessment and technology use suggests that while IBL concepts are embedded in instruction, there is room for improvement in the creation of performance-based assessments and digital inquiry tools. This supports Hmelo-Silver et al. (2007), who emphasized that effective inquiry integration requires alignment of curriculum, instruction, and assessment for sustained learning.

Similarly, Kuhlthau, Maniotes, and Caspari (2015) found that wellstructured inquiry programs improve teacher candidates' capacity to guide exploratory learning and critical thinking. Levy et al. (2013) further highlighted that teacher education institutions with strong inquiry orientations produce more reflective and adaptive practitioners.

The findings therefore affirm that the institution demonstrates a competent level of IBL adoption, reflecting its commitment to innovative teacher preparation while pointing to strategic areas for strengthening assessment and technological support.

Table 2. Perceived Challenges in Implementing Inquiry-Based Learning (IBL)

No.	Indicators	Mean	Descriptive Equivalent / Interpretation
1	Limited time for inquiry lessons.	4.3	Often Experienced
2	Inadequate training in IBL strategies.	4.15	Often Experienced
3	Lack of instructional resources.	4.25	Often Experienced
4	Large class sizes hinder inquiry activities.	4.05	Often Experienced
5	Difficulty in assessing inquiry outcomes.	3.95	Sometimes Experienced
6	Students' resistance to independent learning.	3.8	Sometimes Experienced
7	Limited administrative support.	3.9	Sometimes Experienced
8	Insufficient access to technology.	4.1	Often Experienced
9	Misalignment with standard outcomes.	3.85	Sometimes Experienced
10	Lack of collaboration among educators.	4	Often Experienced
	Overall Mean	4.04	Often Experienced

The results reveal that respondents often experience challenges in implementing Inquiry-Based Learning. The most significant issues include time constraints, insufficient training, and limited instructional materials—factors that frequently impede the shift from traditional to inquiry-oriented instruction.

These results echo the findings of Gillies and Nichols (2015), who reported that the success of inquiry pedagogy depends heavily on institutional support and teacher preparation. Tamir and Lunetta (2010) also highlighted that educators often struggle with IBL implementation due to limited assessment tools, large classes, and curricular rigidity.

Additionally, Abd-El-Khalick et al. (2015) noted that teachers require structured professional development and administrative backing to sustain inquiry practices. The same view is reinforced by Minner, Levy, and Century (2010), who found that systemic and logistical barriers—particularly in teacher education programs—tend to slow the institutionalization of inquiry learning.

Despite these barriers, the moderate frequency of challenges related to student motivation and curricular alignment suggests growing adaptability among pre-service teachers. The data imply that with consistent faculty development and resource support, these challenges can be minimized, making IBL a more sustainable approach in teacher preparation programs.

Table 3. Opportunities from Integrating Inquiry-Based Learning (IBL)

No.	Indicators	Mean	Descriptive Equivalent / Interpretation
1	IBL develops critical and analytical thinking.	4.6	Strongly Agree
2	IBL enhances creativity and innovation.	4.55	Strongly Agree
3	IBL encourages collaboration and teamwork.	4.45	Strongly Agree
4	Improves learner-centered lesson design.	4.4	Agree
5	Increases motivation and engagement.	4.5	Strongly Agree
6	Fosters reflective teaching practices.	4.55	Strongly Agree
7	Promotes deeper understanding of subject matter.	4.5	Strongly Agree
8	Improves communication and presentation skills.	4.35	Agree
9	Encourages authentic assessment.	4.45	Strongly Agree
10	Strengthens professional competence and readiness.	4.6	Strongly Agree
	Overall Mean	4.5	Strongly Agree

Respondents strongly agree that integrating Inquiry-Based Learning provides multiple professional and academic benefits. The high mean ratings highlight how IBL fosters critical thinking, creativity, collaboration, and reflective teaching—competencies essential for 21st-century educators.

This observation is consistent with Prince and Felder (2006), who emphasized that inquiry-driven learning promotes higher-order thinking and student motivation. Tretinjak and Mentek (2018) also affirmed that IBL encourages self-directed learning and innovation, enhancing pre-service teachers' readiness for authentic classroom contexts. Moreover, Savery (2015) found that inquiry and problem-based approaches nurture both pedagogical competence and professional autonomy, preparing teacher candidates to adapt to diverse learner needs.

The study's results also resonate with Schraw, Crippen, and Hartley (2006), who identified reflection and metacognition as core benefits of inquiry learning, strengthening future teachers' decision-making and instructional adaptability.

Overall, the findings underscore that IBL integration is a powerful pedagogical approach that nurtures transformative learning experiences, linking theory and practice effectively. It aligns with the Constructivist Learning Theory (Vygotsky, 1978; Piaget, 1973), which asserts that learners construct knowledge through active exploration and reflection—principles that directly shape competent and innovative educators.

Table 4. Relationship Between the Level of Integration of Inquiry-Based Learning (IBL) and Pre-Service Teachers' Pedagogical Competence and Teaching Readiness

Variables Correlated	Computed r-value	p-value	Decision on H0	Interpretation
Level of IBL Integration and Pedagogical Competence	0.812	0	Reject H0	Significant, Strong Positive Relationship
Level of IBL Integration and Teaching Readiness	0.785	0	Reject H0	Significant, Strong Positive Relationship
Overall Relationship (IBL Integration and Overall Teacher Readiness)	0.798	0	Reject H0	Significant, Strong Positive Relationship

The computed Pearson r-values of 0.812 (for pedagogical competence) and 0.785 (for teaching readiness) indicate a strong positive relationship between the integration of Inquiry-Based Learning (IBL) and the professional preparedness of pre-service teachers. The corresponding p-values (0.000) are less than the 0.05 level of significance, leading to the rejection of the null hypothesis (H₀).

This means that as the extent of IBL integration increases, the pedagogical competence and teaching readiness of pre-service teachers also increase. In other words, greater exposure to inquiry-based practices significantly enhances future teachers' ability to plan, implement, and evaluate learner-centered instruction.

The findings affirm the assertions of Prince and Felder (2006), who found that inquiry and inductive teaching approaches strengthen professional competence and student engagement. Likewise, Savery (2015) emphasized that inquiry-based and problem-based learning environments nurture reflective and adaptive teaching behaviors, thereby improving readiness for real classroom contexts.

Further, Coffman (2017) concluded that IBL encourages pre-service teachers to internalize higher-order thinking and decision-making, vital components of pedagogical competence. Similarly, Minner, Levy, and Century (2010) found a significant link between inquiry-oriented instruction and improved teaching effectiveness and confidence among teacher candidates.

The strong correlation revealed in this study also echoes Schraw, Crippen, and Hartley (2006), who argued that inquiry fosters metacognitive awareness and reflective practice, essential to developing competent educators capable of addressing diverse learner needs.

CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. Inquiry-Based Learning is competently integrated into the teacher education curriculum, demonstrating a strong institutional commitment to developing critical, reflective, and collaborative learners. Nevertheless, there is still room to strengthen the connection between assessment, instructional technology, and inquiry-driven learning to achieve full curricular alignment.
2. The frequent occurrence of these challenges suggests that while teachers and pre-service educators recognize the value of IBL, institutional and logistical constraints continue to hinder its full implementation. This indicates the need for greater support in training, resource allocation, and administrative facilitation to sustain inquiry-oriented practices.
3. Inquiry-Based Learning presents significant opportunities for the holistic development of pre-service teachers. It not only strengthens academic learning but also cultivates essential teaching competencies that promote lifelong learning, reflective practice, and adaptability.
4. There is a strong and significant relationship between the integration of Inquiry-Based Learning and the professional preparedness of pre-service teachers. This means that as IBL is more extensively applied in instruction, preservice teachers develop stronger pedagogical competence and teaching readiness necessary for effective classroom practice.

RECOMMENDATIONS

On the basis of the forgoing findings and conclusions, the following are hereby recommended:

1. Conduct regular capacity-building programs to enhance teachers' competence in IBL methodologies.
2. Allocate sufficient time and resources for the design and implementation of inquiry-based lessons.
3. Improve access to instructional materials and digital technologies that support inquiry activities.
4. Strengthen administrative policies that encourage and monitor the application of IBL in teaching.
5. Promote wider adoption of IBL as a core strategy in lesson design and implementation.
6. Encourage student-led inquiry projects and research-based learning experiences.
7. Integrate reflection journals, peer assessments, and portfolio-based tasks to strengthen reflective practice.
8. Highlight and share exemplary IBL practices to inspire innovation among teacher educators.
9. Strengthen institutional commitment to IBL as a framework for developing pedagogical competence.
10. Integrate inquiry-oriented activities in teaching internships and field experiences.
11. Create professional learning communities to promote collaboration and exchange of IBL practices.
12. Conduct longitudinal studies to evaluate the long-term impact of IBL integration on teaching performance and student outcomes.

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