

A Conceptual Framework for AI-Assisted Problem-Based Learning in Law Courses for Business Students: Integrating Generative AI and IRAC for Legal Reasoning

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ABSTRACT

This conceptual paper aims to develop and explain an AI-Assisted Problem-Based Learning (AI-PBL) framework that integrates Problem-Based Learning (PBL), generative artificial intelligence (AI), and the IRAC (Issue, Rule, Application, and Conclusion) approach for teaching and learning in law-related courses within business degree programmes. The framework draws on the established learning potential of PBL, the structured reasoning function of IRAC, and the emerging educational role of generative AI to propose an integrated process for authentic legal problem-solving.

Keywords: Generative artificial intelligence (AI), problem-based learning (PBL), legal reasoning, AI literacy, business education.

INTRODUCTION

Despite growing interest in generative artificial intelligence (AI), Problem-Based Learning (PBL), and legal reasoning in higher education, limited research has examined how these approaches can be systematically integrated to support learning in law-related courses for business students (Liu & Pásztor, 2022; Francis et al., 2025; Munir, 2025). Existing studies have largely examined PBL, generative AI, and legal reasoning as distinct pedagogical or professional concerns, providing limited guidance on how they can be combined in a structured learning process that preserves students' responsibility for legal analysis, critical evaluation, and decision-making (Bacalso et al., 2026; Sozon et al., 2025). This gap is particularly important in business education, where students encounter legal issues as part of organisational and commercial decision-making rather than as preparation for conventional legal practice alone. A framework that connects authentic problem-solving, structured legal reasoning, and responsible AI use may therefore provide a more coherent approach to developing the competencies required in AI-enabled business environments.

In response to this gap, the present conceptual paper proposes an AI-Assisted Problem-Based Learning (AI-PBL) framework that integrates PBL, generative AI, and the IRAC approach to legal reasoning. The framework combines authentic legal problems situated in business contexts with AI-supported inquiry and a structured process for identifying issues, determining relevant rules, applying those rules to facts, formulating conclusions, and critically reflecting on the quality and responsible use of AI-generated information. The framework is designed around the principle that AI should support learning without displacing students' independent reasoning or professional judgment. The proposed contribution is therefore not the use of AI alone, but the pedagogical integration of AI within a problem-based and IRAC-structured learning process.

Problem Statement

To the authors' knowledge, limited research has explicitly integrated Problem-Based Learning (PBL), the IRAC legal reasoning model, and generative artificial intelligence (AI) within law-related courses for business students. This gap is increasingly important as graduates are expected to apply legal knowledge, exercise professional judgment, and engage responsibly with AI-enabled technologies in contemporary organisational environments (Munir, 2025; Bacalso et al., 2026). The absence of a clearly articulated integrated framework leaves educators

with limited guidance on how AI can be used to support legal learning while maintaining student accountability for analysis and decision-making.

Accordingly, this paper proposes an AI-Assisted Problem-Based Learning (AI-PBL) framework that combines authentic problem-solving, structured legal reasoning, and responsible AI use. The framework seeks to develop legal reasoning and AI literacy as primary learning outcomes, while also supporting critical thinking, problem-solving, ethical decision-making, and professional competence. Its central proposition is that generative AI should function as a controlled learning scaffold: students may use AI to support inquiry, explanation, information exploration, and formative feedback, but they remain responsible for verifying information, evaluating legal authorities, applying rules to facts, and defending their conclusions.

Purpose of the Conceptual Paper

This conceptual paper proposes an AI-Assisted Problem-Based Learning (AI-PBL) framework that integrates Problem-Based Learning (PBL), generative artificial intelligence (AI), and the IRAC (Issue, Rule, Application, and Conclusion) approach to support the teaching and learning of law-related courses for business students. The proposed framework combines the authentic, student-centred nature of PBL, the learning support capabilities of generative AI, and the structured legal reasoning process provided by IRAC (Burton, 2016, 2017). Through this integration, the framework seeks to strengthen students' legal reasoning by guiding them to identify legal issues, determine applicable legal rules, analyse relevant facts, apply legal principles systematically, and formulate well-reasoned conclusions when addressing authentic legal problems in business contexts.

The framework positions generative AI as a learning scaffold rather than a decision-making agent. AI may support inquiry, research, explanation, information analysis, alternative perspectives, and formative feedback, while students remain accountable for interpreting legal issues, evaluating evidence and authorities, verifying AI-generated information, and constructing reasoned legal arguments. This design is intended to encourage active engagement with legal problems while strengthening students' capacity to use AI critically, responsibly, and ethically.

Ultimately, the framework aims to prepare future-ready business graduates who can apply structured legal reasoning and use AI technologies responsibly when addressing legal and business challenges. The proposed model is grounded in evidence that PBL can support critical thinking, analytical reasoning, problem-solving, and higher-order learning (Liu & Pásztor, 2022; Anggraeni et al., 2023; Koçoğlu & Kanadlı, 2025), while emerging research on generative AI emphasises the importance of critical evaluation, academic integrity, governance, and responsible use (Francis et al., 2025; Bacalso et al., 2026; Sozon et al., 2025).

THEORETICAL FOUNDATIONS

Problem-Based Learning

Problem-Based Learning (PBL) is grounded in constructivist learning theory, which views learning as an active process in which learners construct knowledge through engagement with authentic problems and meaningful learning experiences. Rather than passively receiving information, students participate in inquiry, collaboration, reflection, and knowledge application to develop solutions to complex issues. PBL places learners at the centre of the learning process and promotes critical thinking, self-directed learning, problem-solving, and knowledge transfer (Liu & Pásztor, 2022; Anggraeni et al., 2023; Koçoğlu & Kanadlı, 2025). Research has further shown that adaptations of PBL that explicitly emphasise critical thinking can enhance students' analytical and evaluative capabilities (Yu & Zin, 2023). In law-related courses, PBL closely reflects professional practice by requiring students to analyse factual situations, identify legal issues, evaluate alternative courses of action, and develop reasoned solutions to real-world legal and business problems (Oliveira et al., 2022).

AI-Assisted Learning

AI-assisted learning refers to the use of artificial intelligence technologies to support teaching, learning, and assessment activities. Generative AI tools can provide explanations, summarise information, facilitate research, generate examples, and offer feedback that supports student learning (Francis et al., 2025; Sozon et al., 2025).

From an educational perspective, AI can function as a cognitive scaffold by assisting students in accessing information, exploring alternative viewpoints, and refining their understanding of complex concepts (Munir, 2025; Sozon et al., 2025). However, the educational value of AI depends on students' ability to critically evaluate AI-generated outputs, recognise their limitations, and exercise independent judgment (Francis et al., 2025; Bacalso et al., 2026). Consequently, AI should be viewed as a learning support tool rather than a substitute for students' analytical, evaluative, and decision-making processes (Munir, 2025; Bacalso et al., 2026).

AI Literacy

AI literacy encompasses the knowledge, skills, attitudes, and critical awareness required to use AI technologies effectively, responsibly, and ethically. It includes understanding the capabilities and limitations of AI systems, evaluating the reliability of AI-generated information, recognising potential biases, and making informed decisions regarding the appropriate use of AI outputs (Francis et al., 2025; Bacalso et al., 2026). For business students studying law-related subjects, AI literacy is increasingly important because future professionals are likely to work alongside AI systems while remaining accountable for legal compliance, business decisions, and ethical conduct (Munir, 2025; Sozon et al., 2025). Developing AI literacy therefore complements the development of legal reasoning by encouraging students to engage critically with AI-generated information rather than accepting it uncritically (Francis et al., 2025; Bacalso et al., 2026).

IRAC as a Structured Legal Reasoning Framework

Legal reasoning requires students to move systematically from identifying legal problems to formulating justified conclusions. The IRAC approach—Issue, Rule, Application, and Conclusion—provides a structured way of organising this process. Burton (2016) demonstrates how IRAC can be introduced incrementally to support problem-solving and assessment in legal education, while Burton (2017) shows how a legal reasoning grid and criterion-referenced rubric can support students in developing structured legal analysis. In the Issue stage, students identify the legal questions arising from the facts; in the Rule stage, they determine the relevant legal principles and authorities; in the Application stage, they analyse how those rules apply to the facts; and in the Conclusion stage, they formulate a reasoned outcome. Kraal and Coleman (2019) further demonstrate the relevance of structured legal education approaches within business degree contexts. In the present framework, IRAC therefore functions as a cognitive and analytical scaffold that helps business students organise legal reasoning when addressing authentic problems.

Conceptual Development Approach

The AI-PBL framework was developed through conceptual synthesis of four related strands of literature: PBL and its relationship with critical thinking and learning outcomes; generative AI and responsible AI-assisted learning in higher education; legal education and structured legal reasoning; and the teaching of legal studies within business degree programmes. Systematic reviews and meta-analytic evidence provide the basis for the PBL component (Liu & Pásztor, 2022; Anggraeni et al., 2023; Yu & Zin, 2023; Guo et al., 2024; Koçoğlu & Kanadlı, 2025). Research concerning generative AI provides the basis for positioning AI as a learning support mechanism that requires critical evaluation and responsible use (Francis et al., 2025; Sozon et al., 2025; Bacalso et al., 2026). Research on IRAC and legal pedagogy informs the structured legal reasoning component (Burton, 2016, 2017; Oliveira et al., 2022), while work on legal studies in business education establishes the relevance of the context (Kraal & Coleman, 2019). The framework is therefore a conceptual synthesis rather than an empirically validated causal model. Its proposed relationships should be treated as propositions for subsequent empirical testing.

Proposed Ai-Assisted Problem-Based Learning Framework

Framework Overview

The proposed AI-Assisted Problem-Based Learning (AI-PBL) framework integrates three complementary elements: Problem-Based Learning (PBL), generative AI, and the IRAC approach to legal reasoning. PBL provides the pedagogical foundation by engaging students in authentic legal problems situated within business contexts and has been widely recognised for promoting critical thinking, problem-solving, active learning, and

higher-order reasoning skills (Liu & Pásztor, 2022; Anggraeni et al., 2023; Koçoğlu & Kanadlı, 2025). Generative AI functions as a learning support tool that facilitates inquiry, information gathering, feedback, and reflection while supporting personalised and self-directed learning when used responsibly (Francis et al., 2025; Sozon et al., 2025; Munir, 2025). IRAC provides the structured reasoning process that guides students from identifying legal issues to formulating reasoned conclusions and supports the systematic development of legal analysis and problem-solving skills (Burton, 2016, 2017).

Together, these elements create a learning environment in which students actively construct knowledge, develop systematic legal reasoning, and use AI responsibly and critically. The framework consists of five interconnected learning stages: (1) Problem Identification, (2) Investigation and Research, (3) Legal Analysis, (4) Solution Development, and (5) Reflection and Evaluation. Across all stages, students retain primary responsibility for legal analysis, evaluation, and decision-making, while AI serves as a scaffold that supports, rather than replaces, independent reasoning (Francis et al., 2025; Bacalso et al., 2026). This design is consistent with research emphasizing the importance of combining structured inquiry, critical thinking, and responsible AI use to enhance student learning outcomes while preserving academic integrity and independent judgment (Yu & Zin, 2023; Bacalso et al., 2026; Munir, 2025).

Problem Identification (Issue)

The first stage focuses on the **Issue** component of IRAC. Students are presented with authentic legal problems situated within business contexts, such as data privacy breaches, employment disputes, contract violations, consumer protection complaints, or intellectual property conflicts. Authentic problem scenarios are consistent with the principles of Problem-Based Learning and encourage students to engage actively in critical inquiry and problem identification (Oliveira et al., 2022; Yu & Zin, 2023). At this stage, AI functions as a learning scaffold by providing background information, explaining legal terminology, and clarifying the context of the problem (Munir, 2025; Francis et al., 2025). However, students remain responsible for identifying the relevant legal issues and distinguishing legally significant facts from irrelevant information. This process aligns with the **Issue** component of the IRAC framework and strengthens issue-spotting skills, which are fundamental to effective legal reasoning and legal problem-solving (Burton, 2016, 2017). Furthermore, requiring students to independently identify legal issues encourages critical engagement with AI-generated information and reduces the risk of overreliance on AI outputs (Francis et al., 2025).

Investigation and Research (Rule)

The second stage corresponds to the **Rule** component of IRAC. Students conduct legal research by consulting statutes, regulations, judicial decisions, scholarly sources, and relevant business materials to determine the legal principles governing the identified issues. This process enables students to develop a deeper understanding of the legal framework within which business decisions are made and supports the systematic identification of applicable legal rules (Burton, 2016, 2017).

Generative AI can support this process by summarizing lengthy legal materials, explaining statutory provisions, suggesting relevant sources, and generating inquiry questions that guide further investigation (Munir, 2025; Sozon et al., 2025). Nevertheless, students must critically evaluate and verify AI-generated information to ensure its accuracy, reliability, and relevance before incorporating it into their legal analysis (Francis et al., 2025; Bacalso et al., 2026). This stage develops legal research competency while reinforcing students' understanding of applicable legal rules and encouraging the responsible use of AI as a learning support tool rather than a source of unquestioned authority (Francis et al., 2025; Munir, 2025).

Legal Analysis (Application)

The third stage represents the Application component of IRAC and forms the core of legal reasoning (Burton, 2016, 2017). At this stage, students analyse how the identified legal rules apply to the facts of the problem, requiring them to move beyond knowledge acquisition towards higher-order reasoning and decision-making. This process aligns with the objectives of Problem-Based Learning, which emphasises critical thinking, analytical reasoning, and the application of knowledge to authentic situations (Liu & Pásztor, 2022; Anggraeni

et al., 2023).

Key learning activities include:

- Evaluating evidence
- Comparing facts with legal requirements
- Constructing legal arguments
- Considering alternative interpretations
- Assessing potential legal and business implications

These activities encourage students to engage in structured inquiry and critical analysis, which are central to both effective legal reasoning and PBL-based learning (Yu & Zin, 2023; Oliveira et al., 2022). Generative AI may provide alternative perspectives, hypothetical arguments, or counterarguments that enrich discussion and analysis (Munir, 2025; Francis et al., 2025). However, students remain responsible for determining which arguments are legally persuasive, evaluating the validity of AI-generated suggestions, and justifying their reasoning based on applicable legal principles and evidence (Francis et al., 2025). By requiring students to critically assess multiple viewpoints and apply legal rules to complex factual situations, this stage promotes deeper critical analysis and strengthens their ability to connect legal principles with real-world business contexts (Liu & Pásztor, 2022; Yu & Zin, 2023).

Solution Development (Conclusion)

The fourth stage aligns with the **Conclusion** component of IRAC. Based on their analysis, students formulate reasoned conclusions and recommendations regarding the legal problem. This stage requires students to synthesize evidence, legal principles, and analytical findings to produce justified outcomes and recommendations, consistent with the final stage of the IRAC framework (Burton, 2016, 2017).

Possible outputs include:

- Legal opinions
- Compliance reports
- Risk assessments
- Business recommendations
- Advisory memoranda

These outputs reflect authentic professional tasks that require students to apply legal reasoning and communicate their analyses effectively within business and organisational contexts (Oliveira et al., 2022; Munir, 2025). Generative AI may assist with drafting, organising, and refining written outputs, thereby supporting communication and the presentation of ideas (Sozon et al., 2025; Munir, 2025). However, students retain responsibility for the substance of the conclusions and the justification supporting them. They must critically evaluate AI-generated suggestions and ensure that all conclusions are grounded in relevant legal principles, factual evidence, and sound reasoning (Francis et al., 2025; Bacalso et al., 2026). This stage strengthens students' communication and decision-making skills by requiring them to justify legally and ethically informed recommendations (Liu & Pásztor, 2022; Oliveira et al., 2022).

Reflection and Evaluation

The final stage extends learning beyond the traditional IRAC process through structured reflection and evaluation. Students critically assess:

- The effectiveness of their issue identification and legal reasoning;
- The quality, reliability, and accuracy of AI-generated outputs;
- The strengths and limitations of AI as a learning tool;
- Ethical considerations associated with AI use; and
- Their overall learning experience and professional development.

This reflective process is consistent with the self-directed and metacognitive learning principles of Problem-Based Learning, which encourage learners to evaluate their learning processes, identify areas for improvement, and refine their problem-solving strategies (Liu & Pásztor, 2022; Anggraeni et al., 2023). Reflection also supports the development of critical thinking by encouraging students to examine the reasoning behind their conclusions and the effectiveness of their analytical approaches (Yu & Zin, 2023).

In the context of AI-assisted learning, students are required not only to evaluate the reliability, accuracy, limitations, and potential biases of AI-generated outputs, but also to conduct a structured audit of those outputs before incorporating them into their legal analyses and recommendations (Francis et al., 2025; Bacalso et al., 2026). Educators can operationalise this process through an AI verification protocol requiring students to identify specific legal claims generated by AI, trace those claims to authoritative legal sources, verify the existence and accuracy of cited cases, legislation, or legal principles, and assess their currency and jurisdictional relevance. Students should also identify hallucinated authorities, unsupported assertions, inaccurate interpretations, omissions, or contradictions and document any corrections made to the AI-generated output. Where an AI-generated claim cannot be independently verified through an appropriate authoritative source, students should be required to treat the claim as unreliable and exclude it from their final analysis.

This verification process can be supported through a simple AI audit log or reflection checklist in which students record the AI-generated claim, the source used for verification, the verification outcome, and any modification or rejection of the AI output. For example, where generative AI identifies a statutory provision or case as supporting a legal proposition, students should locate the original authority and determine whether the authority actually exists, whether it has been accurately represented, and whether it applies to the relevant facts and jurisdiction. The purpose is not to require students to distrust every AI-generated response, but to develop a disciplined habit of verification in which AI-generated information is treated as a starting point for inquiry rather than as an authoritative legal source. Educators can assess this process by evaluating the quality of students' verification, justification, and reflection rather than merely assessing whether their final answers correspond with the AI-generated response.

This process strengthens AI literacy by fostering a deeper understanding of the capabilities and limitations of generative AI and promoting responsible, ethical, and informed use of AI technologies (Sozon et al., 2025; Bacalso et al., 2026). Furthermore, structured reflection reinforces the professional and ethical dimensions of legal and business decision-making by encouraging students to consider accountability, transparency, and the appropriate role of AI in supporting human judgment (Munir, 2025; Francis et al., 2025). As a result, this stage promotes metacognitive awareness and helps students develop a more sophisticated understanding of both legal reasoning and responsible AI use.

Expected Outcomes

The integration of PBL, IRAC, and generative AI is expected to produce four key educational outcomes.

Enhanced Legal Reasoning

Students develop stronger competencies in identifying legal issues, interpreting legal rules, applying legal principles to factual situations, and formulating reasoned conclusions. Repeated engagement with the IRAC process strengthens their ability to construct logical, evidence-based legal arguments (Burton, 2016, 2017). Furthermore, the use of Problem-Based Learning promotes critical thinking, analytical reasoning, and the application of knowledge to authentic problems, all of which contribute to the development of legal reasoning capabilities (Liu & Pásztor, 2022; Anggraeni et al., 2023; Yu & Zin, 2023). Research in legal education has also shown that problem-based approaches can enhance students' ability to analyse legal issues and develop reasoned

solutions in realistic contexts (Oliveira et al., 2022).

Improved AI Literacy

Students learn to critically evaluate AI-generated information, verify legal content, recognise inaccuracies and limitations, and use AI responsibly within legal and business contexts. As a result, AI becomes a tool for informed learning rather than a substitute for independent thinking. This outcome aligns with the growing emphasis on AI literacy, responsible AI use, and ethical decision-making in higher education (Francis et al., 2025; Bacalso et al., 2026). It also reflects recommendations that students develop the ability to assess the reliability and appropriateness of AI-generated outputs before incorporating them into academic or professional work (Munir, 2025; Sozon et al., 2025).

Greater Student Engagement

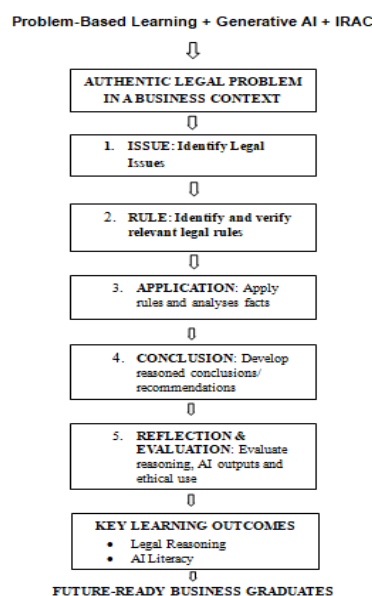
Authentic legal problems increase the relevance and practical value of learning activities, encouraging active participation and deeper engagement. The student-centred nature of PBL motivates learners to take greater responsibility for their learning while fostering collaboration, inquiry, and knowledge construction (Koçoğlu & Kanadlı, 2025; Liu & Pásztor, 2022). AI serves as an accessible learning partner that supports inquiry, exploration, and timely feedback while preserving student responsibility for learning (Sozon et al., 2025; Munir, 2025). Consequently, the integration of authentic problem-solving and AI-supported learning has the potential to enhance learner engagement and educational effectiveness.

Development of Future-Ready Competencies

Students acquire important workplace competencies, including critical thinking, problem-solving, communication, ethical decision-making, professional judgment, and technological literacy. These capabilities are increasingly essential in contemporary professional environments where AI technologies are becoming commonplace (Francis et al., 2025; Bacalso et al., 2026). Research indicates that PBL contributes to the development of higher-order thinking skills, collaborative problem-solving, and knowledge transfer, while responsible engagement with AI technologies supports the development of AI literacy and digital competencies required for future employment (Anggraeni et al., 2023; Liu & Pásztor, 2022; Sozon et al., 2025). For students studying law-related subjects within business programmes, these competencies are particularly valuable as they prepare graduates to address legal and business challenges in increasingly AI-enabled workplaces (Munir, 2025).

Framework/Process and Conceptual Relationships/Outcomes

Figure 1. Proposed AI-Assisted Problem-Based Learning (AI-PBL) Framework Integrating the IRAC Approach



Future-Ready Business Graduates

Figure 1. Proposed AI-Assisted Problem-Based Learning (AI-PBL) Framework Integrating the IRAC Approach.

Accompanying Narrative for Figure 1

Figure 1 illustrates the proposed AI-Assisted Problem-Based Learning (AI-PBL) Framework for developing legal reasoning among students enrolled in law-related courses within business degree programmes. The framework integrates three complementary elements: Problem-Based Learning (PBL), generative artificial intelligence (AI), and the Issue–Rule–Application–Conclusion (IRAC) approach. PBL provides an authentic and problem-centred learning environment, generative AI functions as a learning support tool, and IRAC provides a structured framework for organising legal analysis and reasoning.

The framework begins with an authentic legal problem situated within a business context. Students progress through five interconnected stages. Stage 1, Issue, requires students to identify and frame the relevant legal issues arising from the problem. Stage 2, Rule, involves identifying, verifying, and stating the relevant legal rules and authorities. Stage 3, Application, requires students to apply the relevant legal rules to the facts and critically analyse how those rules relate to the identified issues. Stage 4, Conclusion, involves formulating reasoned conclusions and, where appropriate, recommendations for resolving the legal problem. These first four stages correspond directly to the four components of the IRAC approach.

Stage 5, Reflection and Evaluation, extends the conventional IRAC structure by requiring students to evaluate the quality of their legal reasoning, critically assess AI-generated outputs and sources, identify limitations or inaccuracies, and reflect on the ethical and responsible use of generative AI. This reflective stage is particularly important in an AI-assisted learning environment because students remain responsible for verifying information, evaluating legal authorities, and making their own reasoned judgments rather than relying uncritically on AI-generated responses.

Generative AI operates throughout the problem-solving process as a learning support mechanism rather than as a substitute for student reasoning. It may assist students in exploring information, generating alternative perspectives, clarifying concepts, receiving feedback, and refining their analysis. However, the framework positions students as the primary decision-makers who must critically evaluate AI outputs and independently justify their legal conclusions.

The iterative nature of the framework allows students to revisit earlier stages of the problem-solving process following reflection and evaluation. This feedback and refinement cycle is consistent with the problem-based learning orientation of the framework and encourages students to progressively improve their analysis, reasoning, and decision-making.

The framework is designed to develop two key learning outcomes: legal reasoning and AI literacy. These outcomes are expected to contribute to broader professional competencies, including critical thinking, problem-solving, ethical decision-making, and professional competence. Collectively, these capabilities are intended to support the development of future-ready business graduates who can apply structured legal reasoning while using emerging AI technologies critically, responsibly, and ethically in professional contexts.

Figure 2. Conceptual Model of the AI-PBL Framework for Developing Legal Reasoning

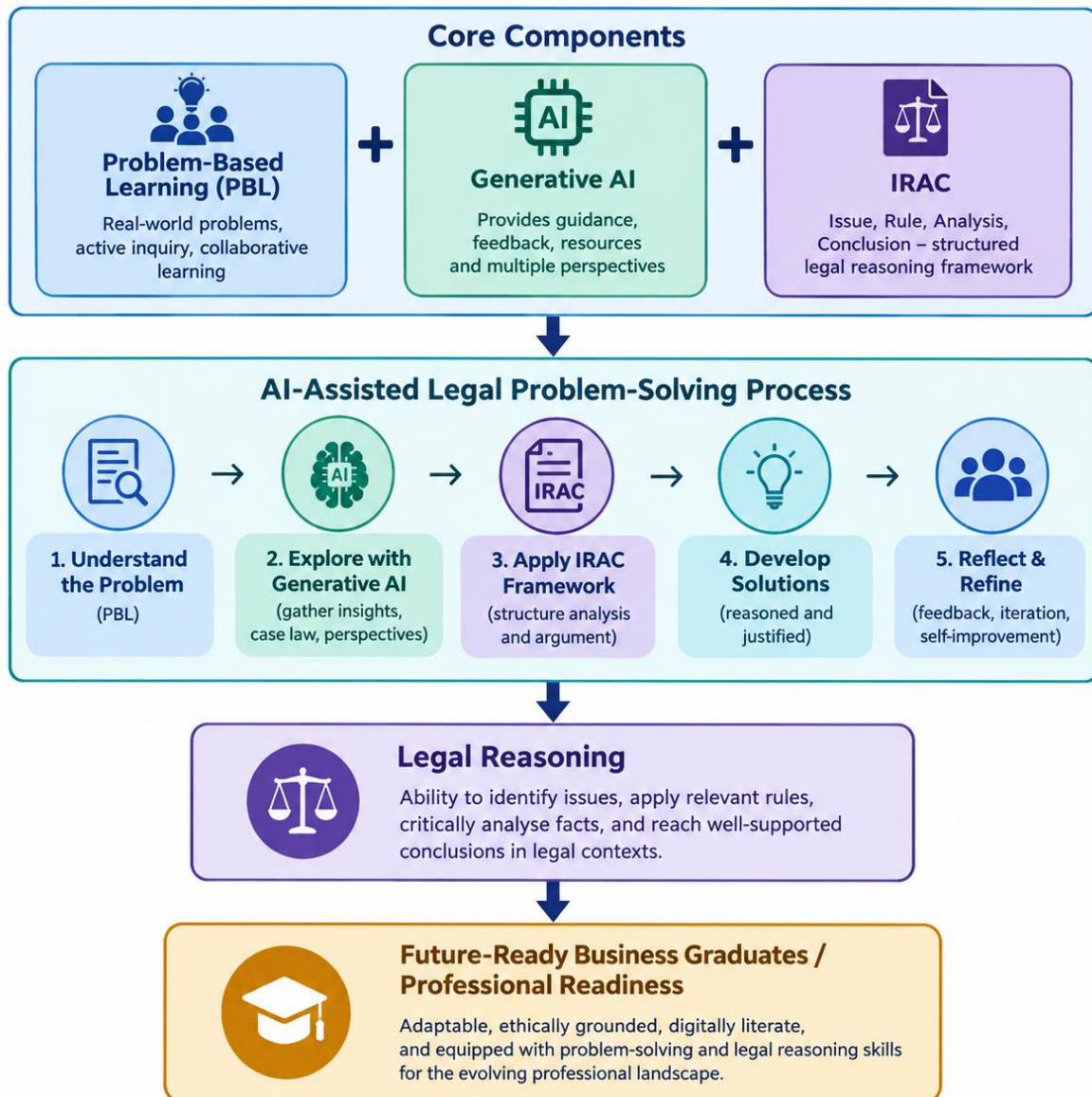


Figure 2 presents the conceptual model underpinning the proposed AI-Assisted Problem-Based Learning (AI-PBL) framework for law courses within business degree programmes. The model integrates three complementary components: Problem-Based Learning (PBL), AI-assisted learning, and the IRAC approach to legal reasoning. PBL provides authentic problem-solving experiences that promote active learning, inquiry, critical thinking, and higher-order reasoning (Liu & Pásztor, 2022; Anggraeni et al., 2023; Koçoğlu & Kanadlı, 2025). AI-assisted learning complements this process by providing support for information exploration, explanation, feedback, and idea generation (Francis et al., 2025; Sozon et al., 2025). IRAC provides a structured approach for organising legal analysis through the identification of issues, relevant rules, application of rules to facts, and formulation of conclusions (Burton, 2016, 2017). Its use in business-degree contexts further demonstrates its relevance for students who undertake legal studies as part of their broader business education (Kraal & Coleman, 2019).

The interaction of these components is operationalised through the AI-PBL framework, in which generative AI functions as a learning support tool within an authentic problem-solving process, while IRAC provides a structured scaffold for legal analysis. The framework is therefore expected to support the development of legal reasoning through repeated engagement with legal problem identification, research, rule selection, application of legal principles to factual circumstances, solution development, and critical reflection. AI is positioned as a learning scaffold rather than a substitute for students' independent analysis, judgment, and decision-making (Bacalso et al., 2026; Munir, 2025). The model consequently emphasises the complementary roles of authentic

problem solving, structured legal reasoning, and responsible use of generative AI in law-related courses for business students.

Explanation of the Proposed Conceptual Model

Figure 2 illustrates the conceptual model underpinning the proposed AI-Assisted Problem-Based Learning (AI-PBL) framework for law courses within business degree programmes. The model integrates three complementary foundations: Problem-Based Learning (PBL), AI-assisted learning, and the IRAC approach to legal reasoning.

PBL serves as the primary pedagogical foundation by engaging students with authentic legal problems situated within business contexts. Rather than receiving legal knowledge solely through direct instruction, students are expected to investigate problems, identify relevant information, evaluate possible solutions, and apply knowledge to realistic situations. This problem-centred approach promotes active learning, inquiry, collaboration, critical thinking, and higher-order reasoning (Liu & Pásztor, 2022; Anggraeni et al., 2023; Koçoğlu & Kanadlı, 2025). The use of PBL is therefore consistent with the objective of developing students' capacity to reason through complex and unfamiliar problems rather than merely recall legal concepts.

AI-assisted learning complements the PBL process by providing students with additional support for information exploration, explanation, idea generation, feedback, and reflection (Francis et al., 2025; Sozon et al., 2025). Within the proposed framework, generative AI is not treated as an independent source of legal authority or as a replacement for students' reasoning. Instead, it functions as a learning scaffold that can assist students during different stages of the problem-solving process. Students remain responsible for evaluating AI-generated information, verifying relevant legal propositions against authoritative sources, and making their own reasoned decisions. This positioning is consistent with concerns regarding the limitations and risks of generative AI in education, including the need for critical evaluation, appropriate governance, and responsible use (Bacalso et al., 2026; Francis et al., 2025; Munir, 2025).

The third component is the IRAC approach, which provides a structured mechanism for organising legal analysis. IRAC directs students to identify the relevant legal issue, determine the applicable rule or rules, apply those rules to the facts, and formulate a reasoned conclusion. Burton (2016, 2017) demonstrates the usefulness of IRAC in teaching and assessing legal problem solving and legal reasoning, while Kraal and Coleman (2019) provide evidence of its relevance in legal studies within business degree programmes. In the proposed AI-PBL framework, IRAC therefore functions as a cognitive and analytical scaffold that helps business students organise their legal reasoning when addressing authentic problems.

The interaction between PBL, AI-assisted learning, and IRAC is operationalised through the AI-PBL learning process. Students first encounter an authentic business-related legal problem and identify the central issues. They then investigate the problem using appropriate sources, with generative AI available as a supplementary learning tool. Relevant legal rules are identified and evaluated before students apply those rules to the facts using the IRAC structure. Students subsequently develop and justify a proposed solution, critically evaluate the reasoning and information used, and reflect on the strengths and limitations of their analysis. This process integrates the inquiry-oriented characteristics of PBL with the structured analytical process of IRAC while using generative AI as a controlled learning support.

The proposed framework is expected to contribute primarily to the development of students' legal reasoning. Legal reasoning is conceptualised as the capacity to identify legally relevant issues, locate and interpret applicable rules, connect legal principles to factual circumstances, evaluate competing arguments, and formulate reasoned conclusions. IRAC provides a structure through which these processes can be practised, while PBL provides authentic problems requiring students to apply them. The integration of generative AI introduces an additional requirement for students to critically examine information and reasoning rather than accept AI-generated responses without verification. In this respect, the framework seeks to preserve student agency and independent judgment while exploiting the potential benefits of AI-assisted learning (Burton, 2016, 2017; Peoples, 2025).

The development of legal reasoning through the AI-PBL framework may subsequently contribute to broader professional capabilities relevant to business graduates, particularly critical thinking, problem-solving, ethical decision-making, and professional judgment. Research on PBL indicates its potential to support critical thinking and higher-order reasoning (Liu & Pásztor, 2022; Anggraeni et al., 2023; Yu & Zin, 2023), while research concerning generative AI in higher education highlights the importance of responsible, critical, and appropriately guided engagement with AI technologies (Bacalso et al., 2026; Francis et al., 2025; Sozon et al., 2025). Accordingly, the proposed model does not position generative AI as the learning outcome. Rather, AI is incorporated as a means of supporting a pedagogically structured learning process in which students develop their capacity to reason, analyse, evaluate, and make informed decisions about legal problems.

Overall, Figure 2 conceptualises the AI-PBL framework as an integration of authentic problem-based learning, generative AI-assisted learning, and IRAC-structured legal analysis. The central proposition is that the combination of these components can provide business students with repeated opportunities to engage in authentic legal problem solving and develop legal reasoning while maintaining responsibility for independent analysis and professional judgment. The framework therefore provides a conceptual foundation for examining how generative AI can be incorporated into law-related courses within business degree programmes without displacing the development of students' own analytical and reasoning capabilities (Burton, 2016, 2017; Kraal & Coleman, 2019; Peoples, 2025).

DISCUSSION

Integration of PBL, IRAC and Generative AI

The central proposition of the AI-PBL framework is that PBL, IRAC, and generative AI perform different but complementary functions. PBL establishes the learning environment by presenting students with authentic and potentially ambiguous legal problems. IRAC structures the reasoning required to address those problems, moving students from issue identification to rules, application, and conclusion. Generative AI adds a layer of learning support that can assist students in exploring information, generating questions, considering alternative perspectives, and receiving formative feedback. The value of the integration therefore lies not in treating AI as an additional content source, but in embedding AI within a pedagogically structured process in which students must reason, verify, justify, and reflect.

This distinction is important because the educational contribution of generative AI depends substantially on how it is positioned within the learning process. If AI is primarily used to produce complete answers, its efficiency may come at the expense of students' engagement with the underlying reasoning process. By contrast, when AI is incorporated as a scaffold within PBL and IRAC, students remain responsible for determining which issues are relevant, which legal authorities are applicable, how the rules relate to the facts, and whether the resulting conclusion is justified. The proposed framework therefore conceptualises AI use as a structured interaction between technological assistance and human judgment rather than as a replacement for legal analysis.

AI as a Scaffold for Independent Legal Reasoning

A defining feature of the proposed framework is the allocation of responsibility between AI and the students. Generative AI may assist with explanation, inquiry, information exploration, and drafting support, but it is not treated as an independent legal authority. Students are required to verify legal propositions against appropriate authoritative sources and to determine whether suggested arguments are relevant and persuasive. This distinction responds to concerns regarding overreliance on AI-generated outputs and the need to preserve critical evaluation and academic integrity (Francis et al., 2025; Bacalso et al., 2026). It also aligns with emerging discussion of generative AI in legal pedagogy, where the educational objective is not simply efficient content production but the development of responsible professional judgment (Munir, 2025; Peoples, 2025).

Within this model, AI functions as a scaffold rather than a substitute for cognition. A student may use AI to request an explanation of an unfamiliar concept, identify possible counterarguments, or obtain suggestions for further research. However, the student remains responsible for determining whether the information is accurate, legally relevant, and supported by appropriate authority. This allocation of responsibility is particularly

important in legal education because plausible-sounding AI-generated statements may nevertheless be incomplete, outdated, unsupported, or inappropriate to the relevant jurisdiction. Requiring students to verify AI outputs therefore transforms a potential weakness of generative AI into an opportunity for developing evaluative judgment.

The framework consequently encourages a form of AI engagement in which students move between generation and verification. AI may broaden the range of possibilities considered by the student, while legal authorities and structured reasoning provide the basis for deciding which possibilities should ultimately be accepted. In this respect, the framework seeks to preserve independent analysis while recognising that responsible professional practice increasingly requires the ability to work critically with AI-supported information.

Development of Legal Reasoning and AI Literacy

The framework proposes legal reasoning and AI literacy as its two primary learning outcomes. Legal reasoning is developed through repeated engagement with authentic problems and the structured IRAC process, requiring students to identify issues, locate and interpret rules, apply principles to facts, evaluate competing arguments, and formulate justified conclusions (Burton, 2016, 2017; Oliveira et al., 2022). AI literacy develops concurrently because students must assess the reliability, limitations, relevance, and ethical implications of AI-generated information.

The two outcomes are therefore mutually reinforcing. Structured legal reasoning provides students with criteria against which AI-generated suggestions can be evaluated, while critical engagement with AI requires students to make explicit judgments about evidence, authority, accuracy, and relevance. A student who understands how to identify a legal issue and distinguish authoritative from non-authoritative sources is better positioned to recognise weaknesses in an AI-generated response. Conversely, repeated evaluation of AI outputs can encourage students to articulate why a particular legal proposition is insufficiently supported, why a counterargument is stronger, or why a particular source should be preferred.

This relationship provides a distinctive conceptual contribution of the AI-PBL framework. Rather than treating legal reasoning and AI literacy as separate educational objectives, the framework positions them as interconnected capabilities. The ability to use generative AI responsibly is therefore not limited to technical prompt-writing skills. It involves the capacity to question, verify, contextualise, and critically evaluate AI-generated information using domain-specific knowledge and reasoning.

Relevance to Business Education

The framework is specifically situated in law-related courses within business degree programmes. This context is important because business students may need legal knowledge to inform organisational decisions without necessarily undertaking the full professional formation of law students. Authentic scenarios involving contracts, employment, consumer protection, data privacy, intellectual property, and compliance can connect legal reasoning with business decision-making.

The framework therefore treats legal reasoning as a transferable business competency that can be developed through problem-based learning and structured analysis. Business students may encounter legal issues not as isolated doctrinal questions but as components of broader organisational decisions involving risk, compliance, stakeholder interests, reputation, and operational consequences. A problem involving employee dismissal, for example, may require consideration not only of the relevant legal rules but also of procedural fairness, organisational risk, documentation, and potential reputational consequences. Similarly, a data privacy problem may require students to consider the relationship between legal compliance, customer trust, data governance, and business strategy.

This contextualisation is consistent with research highlighting the teaching of legal studies within business education and with legal-education research emphasising active, authentic learning experiences (Kraal & Coleman, 2019; Oliveira et al., 2022). PBL is particularly suitable for this context because it enables students to encounter law as part of a decision-making problem rather than merely as a body of rules to be memorised. The incorporation of IRAC and generative AI further provides a structured mechanism through which students can

develop both legal analysis and the ability to engage critically with emerging workplace technologies.

Conceptual Propositions for Future Testing

The proposed relationships can be expressed as conceptual propositions for future empirical investigation.

First, structured engagement with authentic problems through PBL is expected to support students' critical thinking and higher-order reasoning. Second, the use of IRAC within those problems is expected to provide a consistent structure for practising legal reasoning. Third, guided use of generative AI is expected to support inquiry and feedback without replacing independent analysis when students are required to verify and justify their work. Fourth, repeated reflection on AI outputs is expected to strengthen AI literacy and responsible AI use. Fifth, the combined process is expected to contribute to broader competencies such as problem-solving, ethical decision-making, communication, and professional judgment.

A further proposition concerns the conditions under which the framework can operate effectively. The effectiveness of the AI-PBL framework is expected to be moderated by institutional readiness and faculty capability, including the availability of appropriate AI-use policies, faculty development, assessment redesign, and mechanisms for supporting students in verifying AI-generated information. This proposition is important because pedagogical integration cannot be assumed to occur simply through the availability of generative AI tools. Institutional policies, staff expertise, assessment practices, and access to appropriate technological resources may influence whether AI is used as a learning scaffold or as a substitute for independent work.

These propositions should be tested rather than treated as established causal effects because the present paper is conceptual in nature. Future empirical studies could examine whether different levels of AI guidance influence students' legal reasoning, AI literacy, verification behaviour, and confidence. Research could also investigate whether institutional readiness and faculty development moderate these outcomes. Such investigation would help establish not only whether the framework is educationally effective, but also under what conditions it can be implemented sustainably.

Practical Implementation: Institutional Readiness and Faculty Development

Although the AI-PBL framework provides a pedagogical structure for integrating generative AI into business-related legal education, its implementation is likely to depend substantially on institutional readiness and faculty capacity. The availability of generative AI tools alone does not ensure meaningful pedagogical integration. Institutions need to establish appropriate policies concerning acceptable AI use, academic integrity, data privacy, assessment, and the handling of confidential or commercially sensitive information. These considerations are particularly important in law-related business education, where students may work with realistic contractual, employment, consumer, or data-protection scenarios containing information that should not be entered into publicly accessible AI systems. Institutional guidance should therefore distinguish between appropriate educational experimentation with AI and the inappropriate disclosure of personal, confidential, or proprietary information.

Faculty readiness represents a further implementation challenge. Effective use of the framework requires instructors to understand not only the capabilities and limitations of generative AI but also how AI can be embedded within PBL and IRAC without displacing student reasoning. Faculty development should consequently extend beyond basic technical training. Instructors may require professional development in prompt design, verification of AI-generated legal propositions, identification of hallucinations and unsupported claims, AI-assisted assessment design, and strategies for facilitating critical discussion of AI outputs. Faculty should also be equipped to redesign learning activities so that students are assessed on the reasoning process rather than merely on the quality or fluency of the final AI-assisted product.

Institutional implementation may therefore benefit from a staged approach. Initial implementation could involve carefully designed, low-risk activities in which students are explicitly required to disclose their use of AI, compare AI-generated responses with authoritative legal sources, and identify errors or omissions. Subsequent stages could incorporate more complex problem-based activities requiring students to evaluate competing AI-generated arguments and defend their own conclusions. Such an approach would allow institutions to develop

both student and faculty AI literacy progressively while generating evidence about the effectiveness and risks of the framework.

Assessment design is also critical. If conventional assessment rewards only polished written outputs, students may have limited incentive to engage critically with the AI-assisted reasoning process. Assessment within the AI-PBL framework should instead make students' analytical processes visible. For example, students could be required to submit an initial issue identification, the prompts used with an AI system, selected AI outputs, verification against authoritative sources, an explanation of corrections made to the AI output, and a final IRAC analysis. This form of process-oriented assessment can position AI as an object of critical evaluation rather than as a substitute for independent legal reasoning.

At the same time, institutions must recognise that implementation involves practical constraints. Faculty workload, unequal levels of digital confidence, access to approved AI tools, class size, assessment requirements, and uncertainty about evolving institutional policies may affect adoption. Faculty may also need support in determining how much AI use is appropriate at different stages of a course and how to distinguish productive assistance from excessive reliance. Consequently, successful implementation is likely to require institutional leadership, clear governance, sustained faculty development, and opportunities for instructors to share experiences and refine practice.

These implementation considerations should be understood as practical implications of the proposed framework rather than established empirical findings. Their effectiveness requires future investigation. Nevertheless, making these conditions explicit strengthens the framework by recognising that pedagogical innovation is shaped not only by the design of a learning activity but also by the institutional environment in which that activity is implemented.

Illustrative Application of the AI-PBL Framework

The framework can be demonstrated through a data privacy scenario. A company uses an AI-supported analytics system to process customer data, but a customer complains that their information was used for marketing without sufficient consent or notice. Students then assess the legal and business implications of the data use. The scenario is intentionally open-ended, requiring students to determine the relevant legal issues, identify applicable rules, apply those rules to the facts, and formulate a justified recommendation.

At the Issue stage, students first identify the legal questions independently. They might formulate issues such as whether the company's collection or subsequent use of personal data is legally permissible, whether the original purpose for which the data was collected permits the new marketing use, and what obligations the company may have toward the affected customer. Generative AI can be used at this stage as an inquiry scaffold. For example, a student might ask the AI system to suggest potential legal issues arising from the scenario. The AI output may provide several possibilities, including consent, purpose limitation, transparency, data security, and regulatory compliance. However, the student should not simply adopt these suggestions. Instead, students should critically assess AI suggestions, identify omitted issues, and refine the final issue statement based on the facts and relevant law.

At the Rule stage, students identify the authoritative legal sources governing the issues they have selected. Generative AI may assist by suggesting potentially relevant legislation, regulatory concepts, cases, or keywords for further research. Its role at this stage is therefore primarily exploratory rather than authoritative. Students must locate and consult the actual legislation, cases, regulatory guidance, or other recognised legal authorities and determine whether the AI-generated suggestions are accurate and applicable. For example, if the AI system identifies a particular statutory provision concerning consent or the use of personal data, the student should verify the provision using the official legislative source rather than relying on the AI-generated summary. This verification requirement is essential because an apparently plausible AI-generated legal proposition may be incomplete, outdated, jurisdictionally inappropriate, or entirely unsupported.

At the Application stage, the emphasis shifts from information retrieval to independent legal reasoning. Students apply the verified rules to the facts of the business scenario and consider arguments supporting different

positions. Generative AI may be used to generate alternative perspectives, such as an argument that the company's existing customer consent permits the new use of the data and a counterargument that the new purpose is sufficiently different to require additional consent or notification. The student must then assess these arguments against the verified legal rules and facts. Rather than asking AI to produce the final application, students can use it to challenge their reasoning by asking questions such as, "What counterargument might the customer raise?" or "What factual assumption would weaken this argument?" The resulting suggestions become material for critical evaluation, not conclusions to be copied.

At the Conclusion stage, students formulate their own conclusion and business recommendation based on the preceding analysis. AI may be used to test whether the conclusion addresses the major issues identified at the beginning of the analysis or to identify possible practical considerations that the student has overlooked. However, the conclusion should remain the student's responsibility. For example, the student might conclude that the company should not proceed with the proposed data use until the legal and transparency requirements have been reviewed and, where necessary, additional consent or notification procedures have been implemented. The student should be able to explain why that conclusion follows from the verified authorities and application of the rules to the facts, irrespective of whether the AI system initially suggested the same outcome.

This example demonstrates that generative AI can be embedded at each stage of IRAC without transferring responsibility for legal reasoning from the student to the technology. The nature of AI engagement changes across the process: it can support issue exploration, facilitate research direction, generate alternative arguments during application, and provide reflective feedback at the conclusion stage. At every stage, however, students retain responsibility for verification, evaluation, justification, and the final decision. The pedagogical distinction is therefore between using AI to expand the space of inquiry and using AI to determine the answer. The former is consistent with the proposed AI-PBL framework; the latter risks undermining the development of independent legal reasoning.

The same principle can be applied to other business-related legal problems. For example, an employment dispute involving an alleged discriminatory dismissal could require students to identify the relevant legal issues, verify the applicable employment protections, evaluate competing arguments concerning the employer's justification for dismissal, and formulate a recommendation for the organisation. In both scenarios, PBL provides the authentic and ambiguous context, IRAC provides the reasoning structure, and generative AI functions as a controlled cognitive scaffold. The framework consequently seeks not to maximise students' use of AI but to make their use of AI pedagogically purposeful, transparent, and subject to critical human judgment.

Taken together, these implementation considerations and the illustrative scenario clarify how the AI-PBL framework can move from a conceptual model to a potentially implementable pedagogical approach. Its effectiveness, however, cannot be assumed solely from the theoretical compatibility of PBL, IRAC, and generative AI. Future empirical research should examine whether different levels of AI guidance produce measurable differences in students' legal reasoning, AI literacy, verification behaviour, and confidence, while also investigating the institutional and faculty conditions necessary for sustainable implementation. In this respect, the framework's contribution lies not simply in proposing that generative AI be introduced into legal education, but in specifying how its use can be pedagogically structured so that technological assistance remains subordinate to independent reasoning, authoritative legal verification, and responsible professional judgment.

Theoretical And Practical Implications

The proposed AI-PBL framework has theoretical implications for the study of AI-enhanced pedagogy by bringing together three perspectives that are often examined separately: problem-based learning, structured legal reasoning, and responsible use of generative AI. The framework extends a conventional view of AI-assisted learning beyond information access and content generation by placing AI within an active learning process that requires students to analyse, evaluate, justify, and reflect. It also extends the application of IRAC by embedding the reasoning structure within authentic, inquiry-oriented problems rather than treating IRAC solely as a writing or assessment format.

The framework also has implications for curriculum and institutional practice. Because responsible AI use

depends not only on individual students but also on clear expectations and educational support, institutions may need to align assessment practices, AI-use guidance, academic-integrity policies, and staff development with emerging AI capabilities (Bacalso et al., 2026). In the proposed framework, these institutional considerations are translated into learning activities that make verification, attribution, critical evaluation, and responsible use visible components of the learning process.

From a practical perspective, the framework provides educators with a structured approach for incorporating generative AI into law-related courses within business degree programmes. The five-stage learning process offers guidance for designing learning activities that engage students with authentic legal problems while maintaining their responsibility for legal analysis. The integration of the IRAC approach further supports systematic progression from identifying legal issues to developing reasoned conclusions, thereby strengthening students' analytical capabilities and professional communication skills (Burton, 2016, 2017; Oliveira et al., 2022). Furthermore, the use of authentic problem-solving and PBL principles is consistent with research demonstrating the effectiveness of PBL in promoting critical thinking, analytical reasoning, and active learning (Liu & Pásztor, 2022; Koçoğlu & Kanadlı, 2025; Anggraeni et al., 2023).

Finally, the framework provides a foundation for empirical research. Future studies can examine whether AI-PBL improves legal reasoning and AI literacy compared with conventional instruction, how different forms of AI guidance influence student learning, and whether the framework produces transferable gains in critical thinking, problem-solving, and professional judgment. Design-based, quasi-experimental, case-study, and mixed-methods research could be used to refine and validate the framework in authentic educational settings.

Finally, the proposed framework offers a foundation for future empirical research. Subsequent studies may examine its effectiveness in enhancing legal reasoning, AI literacy, student engagement, and professional competencies among business students. Researchers may also investigate the relationships among the framework's components and evaluate its applicability across different law-related subjects, educational settings, and student populations. Such research would contribute to the refinement and validation of the framework while advancing understanding of the effective integration of generative AI in higher education (Francis et al., 2025; Sozon et al., 2025). Moreover, future studies could explore how AI-supported PBL environments influence critical thinking, legal reasoning, and higher-order learning outcomes across diverse disciplinary contexts (Liu & Pásztor, 2022; Anggraeni et al., 2023; Yu & Zin, 2023).

LIMITATIONS AND FUTURE RESEARCH

The present paper is conceptual and has not empirically validated the proposed AI-Assisted Problem-Based Learning (AI-PBL) framework. Consequently, the expected relationships among PBL, generative AI, IRAC, legal reasoning, and AI literacy remain propositions requiring empirical investigation. Existing literature provides evidence for relevant components of the framework, including PBL and critical thinking, legal education approaches, and emerging uses and challenges of generative AI, but it does not establish the effectiveness of the specific integrated framework proposed here (Liu & Pásztor, 2022; Anggraeni et al., 2023; Burton, 2016, 2017; Bacalso et al., 2026).

Second, the framework is developed primarily for law-related courses within business degree programmes and may require adaptation before implementation in other disciplinary contexts or educational settings. The legal reasoning processes embedded within the framework are informed by the IRAC approach and the specific learning outcomes associated with legal education (Burton, 2016, 2017; Oliveira et al., 2022). Consequently, modifications may be necessary when applying the framework to disciplines that employ different approaches to problem-solving and professional reasoning.

Third, the effectiveness of the framework may be influenced by factors such as students' prior knowledge, digital competencies, familiarity with AI technologies, and instructors' capacity to facilitate AI-supported learning activities. Research has highlighted the importance of AI literacy, responsible AI use, and institutional readiness in ensuring the effective integration of generative AI within higher education (Bacalso et al., 2026; Francis et al., 2025). Similarly, variations in learners' critical thinking abilities, problem-solving skills, and experience with PBL may influence learning outcomes (Liu & Pásztor, 2022; Yu & Zin, 2023).

Finally, the rapidly evolving nature of generative AI may affect the applicability and relevance of specific AI tools over time, necessitating periodic review and refinement of the framework. As AI technologies continue to evolve, higher education institutions and educators must continually reassess pedagogical practices, governance mechanisms, and ethical considerations associated with AI adoption (Bacalso et al., 2026; Sozon et al., 2025).

Future research should adopt clearly defined empirical designs to systematically test and refine the proposed AI-PBL framework in authentic educational settings. Design-based research (DBR) would be particularly appropriate for this purpose because it would enable researchers to implement the framework through successive cycles of design, implementation, evaluation, and refinement, while generating both practical and theoretical insight into the integration of generative AI within law-related courses for business students. DBR could, for example, examine how different levels of AI guidance, verification requirements, and reflective activities influence students' engagement with the IRAC process and subsequently refine the framework based on observed learning behaviours and outcomes.

Comparative case studies could provide a complementary approach by examining traditional PBL and AI-PBL classrooms across comparable business-law courses. Such studies could investigate differences in how students identify legal issues, locate and evaluate authoritative sources, construct arguments, apply legal rules to facts, and justify conclusions. They could also explore students' and instructors' experiences of AI integration, including perceptions of usefulness, overreliance, verification practices, and changes in learning and teaching processes. Where institutional conditions permit, quasi-experimental designs could further compare students exposed to AI-PBL with those receiving conventional PBL or non-AI instructional approaches, using pre- and post-intervention measures of legal reasoning, AI literacy, critical thinking, problem-solving, and related learning outcomes. Mixed-methods studies could subsequently integrate these outcome measures with qualitative evidence from student work, interviews, classroom observations, and AI-use records to explain not only whether the framework is effective, but also how and under what conditions it produces its effects.

These methodological approaches would enable direct empirical testing of the framework's core propositions, including the contribution of PBL to higher-order reasoning, the role of IRAC in structuring legal analysis, the function of generative AI as a scaffold rather than a substitute for independent reasoning, and the development of AI literacy through verification and reflection. They could also examine whether institutional readiness and faculty capability moderate the effectiveness of AI-PBL implementation. Such investigations would extend existing research on PBL, critical thinking, and AI-enhanced learning by examining how these elements interact within a structured legal reasoning environment and by identifying the pedagogical and institutional conditions necessary for responsible and effective AI integration (Liu & Pásztor, 2022; Anggraeni et al., 2023; Munir, 2025).

Despite these limitations, the proposed framework offers a useful conceptual foundation for advancing research and practice on the effective and responsible integration of AI into law-related courses within business degree programmes. By combining Problem-Based Learning, generative AI, and the IRAC approach, the framework responds to emerging calls for pedagogical models that promote both higher-order thinking and responsible AI use in higher education (Francis et al., 2025; Bacalso et al., 2026; Munir, 2025).

CONCLUSION

The proposed AI-Assisted Problem-Based Learning (AI-PBL) framework provides a structured conceptual approach for integrating Problem-Based Learning, generative AI, and IRAC-based legal reasoning within law-related courses for business students. The framework responds to the need for pedagogical approaches that can harness the learning-support potential of generative AI while preserving students' responsibility for legal analysis, critical evaluation, and professional judgment. Its five-stage process combines authentic problem identification, legal research, structured application of rules, solution development, and reflection on both reasoning and AI use.

The framework positions legal reasoning and AI literacy as its primary learning outcomes, with potential implications for critical thinking, problem-solving, ethical decision-making, communication, and professional competence. Its conceptual contribution lies in integrating PBL, IRAC, and generative AI into a coherent

learning process rather than treating them as separate educational practices. The framework should not, however, be interpreted as empirically validated. Its proposed relationships require systematic investigation across different student populations, law-related subjects, instructional settings, and forms of AI support.

Overall, the AI-PBL framework provides a foundation for educators and researchers seeking to integrate generative AI responsibly into legal and business education. By requiring students to verify information, evaluate AI-generated suggestions, apply legal principles to authentic problems, justify conclusions, and reflect on responsible AI use, the framework seeks to preserve the central role of human reasoning while preparing business graduates for increasingly AI-enabled professional environments.

REFERENCES

1. Anggraeni, D. M., Prahani, B. K., Suprpto, N., Shofiyah, N., & Jatmiko, B. (2023). Systematic review of problem-based learning research in fostering critical thinking skills. *Thinking Skills and Creativity*, 49, 101334. <https://doi.org/10.1016/j.tsc.2023.101334>
2. Bacalso, F. D., Villamor, F. E., Paclipan, C. P., Orquia, C. J. B., Rendon, I. P., Albiso, A. T., & Himang, C. M. (2026). Institutional approaches to generative AI management in higher education: A systematic review. *Frontiers in Education*, 11, 1814426. <https://doi.org/10.3389/educ.2026.1814426>
3. Burton, K. (2016). Teaching and assessing problem solving: An example of an incremental approach to using IRAC in legal education. *Journal of University Teaching & Learning Practice*, 13(5). <https://doi.org/10.53761/1.13.5.8>
4. Burton, K. (2017). "Think like a lawyer" using a legal reasoning grid and criterion-referenced assessment rubric on IRAC (Issue, Rule, Application, Conclusion). *Journal of Learning Design*, 10(2), 57–68. <https://doi.org/10.5204/jld.v10i2.229>
5. Francis, N. J., Jones, S., & Smith, D. P. (2025). Generative AI in higher education: Balancing innovation and integrity. *British Journal of Biomedical Science*, 81, 14048. <https://doi.org/10.3389/bjbs.2024.14048>
6. Guo, Q., Jamil, H., Ismail, L., Luo, S., & Sun, Z. (2024). Effects of problem-based learning on EFL learning: A systematic review. *PLOS ONE*, 19(12), e0307819. <https://doi.org/10.1371/journal.pone.0307819>
7. Koçoğlu, A., & Kanadlı, S. (2025). The effect of problem-based learning approach on learning outcomes: A second-order meta-analysis study. *Educational Research Review*, 48, Article 100690. <https://doi.org/10.1016/j.edurev.2025.100690>
8. Kraal, D., & Coleman, A. (2019). Teaching legal studies in business degrees: A review of a method and its practice. *Australian Journal of Teacher Education*, 44(11), 18–41. <https://doi.org/10.14221/ajte.2019v44.n11.2>
9. Liu, Y., & Pásztor, A. (2022). Effects of problem-based learning instructional intervention on critical thinking in higher education: A meta-analysis. *Thinking Skills and Creativity*, 45, 101069. <https://doi.org/10.1016/j.tsc.2022.101069>
10. Munir, B. (2025). Integrating generative AI in legal pedagogy: A case study. *International Journal of Legal Information*, 53(3), 272–284. <https://doi.org/10.1017/jli.2025.10081>
11. Oliveira, H., Sanches, T., & Martins, J. (2022). Problem-based learning in a flipped classroom: A case study for active learning in legal education in international law. *The Law Teacher*, 56(4), 435–451. <https://doi.org/10.1080/03069400.2022.2040934>
12. Peoples, L. F. (2025). Artificial intelligence and legal analysis: Implications for legal education and the profession. *Law Library Journal*, 117(1), 52–85. <https://www.aallnet.org/wp-content/uploads/2025/02/LLJ-Vol-117-No-1-2025-FINAL.pdf>
13. Sozon, M., Parnter, C., Wong, W. L., & Chowdhury, M. A. (2025). Generative AI in higher education: Navigating benefits and challenges in the technological era. *Journal of Applied Research in Higher Education*. <https://doi.org/10.1108/JARHE-02-2025-0103>
14. Yu, L., & Zin, Z. M. (2023). The critical thinking-oriented adaptations of problem-based learning models: A systematic review. *Frontiers in Education*, 8, 1139987. <https://doi.org/10.3389/educ.2023.1139987>