

Adapting Problem-Based Learning in Iranian Military Universities: A Localized Framework for Enhancing Critical Thinking and Adaptive Leadership in Professional Military Education

Mohammad Azizi¹ , Alireza Tanhaei² 

1. PhD in TEFL; Lecturer, Center for Foreign Languages, Faculty of Science and Technology, Farabi, Tehran, Iran, mohammad.azizi69@gmail.com
2. Associate Professor, Department of Basic Sciences, Faculty of Science and Technology, Farabi, Tehran, Iran

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ABSTRACT

Objective: In contemporary operational environments marked by volatility, uncertainty, complexity, and ambiguity, conventional lecture-based instruction no longer meets the authentic requirements of military officers, particularly in cultivating adaptive decision-making, collaborative problem-solving, and self-directed learning. This study examined Problem-Based Learning (PBL) as a learner-centered pedagogical approach for professional military education, with specific reference to Iran's officer universities.

Methods: An analytical and integrative review was conducted, drawing on international precedents—notably experimental PBL implementation at the Norwegian Defense University and U.S. senior service colleges—alongside recent reforms in professional military education systems, to synthesize and critically appraise the existing evidence base.

Results: The analysis identified opportunities arising from Iran's existing emphasis on operational readiness, simulation-driven training, and Islamic-Iranian value systems, alongside persistent barriers including resource limitations, entrenched teacher-centered methodologies, and the need for alignment with the ideological and strategic imperatives of the armed forces. Building on this appraisal, the study proposes the Iranian Military Problem-Based Learning Framework (PBL-IMAF), integrating authentic problem design, a blended flipped-classroom and facilitated-PBL architecture, faculty development, culturally responsive assessment, and explicit integration of Islamic-Iranian values, supported by a phased implementation roadmap of preparation, piloting, scaling, and institutionalization.

Conclusions: When adapted through principled localization, PBL can offer an effective and operationally relevant pathway for improving professional military education in Iran while reinforcing Islamic-Iranian identity, operational doctrine, and strategic priorities. The proposed framework contributes to both international military pedagogy discourse and domestic pedagogical reform in Iran's officer universities.

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Introduction

Contemporary armed forces operate within environments characterized by high levels of volatility, uncertainty, complexity, and ambiguity. Under such conditions, officers must possess not merely sufficient theoretical knowledge but also the capacity to render rapid, informed decisions under conditions of incomplete information, to manage hybrid threats, and to function effectively within decentralized command structures. Nevertheless, the traditional lecture-based model of instruction, which continues to predominate in many military educational systems, remains predominantly oriented toward unidirectional knowledge transmission. This model has demonstrated limited efficacy in developing higher-order skills such as critical analysis, collaborative performance under pressure, and reflective practice (Goldman et al., 2024; Leibel, 2021). The resultant gap has become increasingly conspicuous in contemporary operational settings where rapid, adaptive decision-making constitutes a genuine operational necessity.

Problem-Based Learning constitutes a learner-centered approach in which learners are confronted with authentic or simulated problems, identify their own knowledge gaps, engage in collaborative inquiry and analysis, and ultimately formulate practical solutions. Originally rooted in medical education, this methodology has, in recent decades, attracted the attention of professional military education systems. Notwithstanding its potential benefits, the direct transplantation of Western models into non-Western contexts—without due regard for divergent value systems, organizational structures, and national strategic priorities—may give rise to substantial challenges (Duraid & Annen, 2019). Consequently, the intelligent and purposeful localization of this approach within Iranian officer universities represents a strategic imperative.

In the Islamic Republic of Iran, officer universities bear the responsibility of preparing commanders and specialists who remain steadfast in their commitment to Islamic-Iranian values while possessing high levels of operational readiness. Although notable advances have been achieved in recent years in the domains of e-learning, simulation-based training, and research-oriented approaches (Masoumi-Fard, 1402; Rashidzadeh Fathollah et al., 1391), the systematic application of Problem-Based Learning within officer education programmed has yet to be developed in a comprehensive and structured manner. The present article evaluates the international experience of Problem-Based Learning in professional military education, assesses

the feasibility of its transfer to the Iranian context, and proposes a localized framework tailored to the officer universities of the Islamic Republic of Iran.

Literature Review: Theoretical Foundations and Global Experiences

Professional military education in the current era requires fundamental transformation. Traditional models predicated upon unidirectional lecturing and the central role of the instructor, whilst efficient in transmitting theoretical knowledge, exhibit pronounced weaknesses in cultivating the higher-order skills demanded of command in volatile, uncertain, complex, and ambiguous operational environments. These models prove insufficient for the development of critical thinking, decision-making under conditions of ambiguity, collaborative performance under duress, and self-directed learning (Goldman et al., 2024; Leibel, 2021). In contrast, learner-centered and adaptive approaches possess the potential to foster the intellectual agility requisite for command within decentralized structures and complex operations.

Problem-Based Learning stands as one of the most prominent learner-centered methodologies. Grounded in constructivist principles, this approach situates learners in authentic problem-solving contexts, compelling them to engage in the active construction of knowledge, metacognition, and collaborative inquiry (Hmelo-Silver, 2004). The competencies thus developed align directly with mission-oriented command and the art of operations. Success in one context, however, does not guarantee success in another; the direct transfer of the model without sensitivity to cultural, organizational, and value-based differences can engender significant difficulties.

The empirical foundation for Problem-Based Learning in medical education is robust. Multiple meta-analyses indicate that the approach substantially enhances clinical reasoning among practitioners and supports long-term knowledge retention (Koh et al., 2008; Dolmans et al., 2005). Nevertheless, the direct generalization of these findings to the military domain warrants considerable caution, given that the nature of military problems, the level of risk, temporal pressures, and ethical-ideological requirements differ fundamentally from those encountered in medical training. Consequently, whilst medical evidence remains valuable, it cannot, in isolation, serve as the sole basis for policy formulation in officer education. The military analogue of these competencies may be conceptualized as “operational reasoning and command decision-making”—that is, the capacity of officers to analyses complex operational situations, evaluate options, and reach appropriate decisions under conditions of ambiguity and pressure.

Within the military domain, applications of Problem-Based Learning, though more limited than in medicine, have yielded promising results. Most such studies, however, have been conducted on a small scale and lack longitudinal tracking of actual field performance. Furthermore, rigorous, systematic investigations within non-Western military education systems—characterized by strong ideological frameworks, hierarchical structures, and resource constraints—remain scarce (Duraïd & Annen, 2019; Anstad, 2025). This lacuna indicates that even the transferable principles of Problem-Based Learning require conscious and purposeful localization for effective adoption. The present article, by advancing a context-specific, localized framework for Iranian officer universities, constitutes an endeavor to address this very theoretical and empirical gap.

Material and Methods

This study employs an analytical review methodology incorporating comparative elements, a design well suited to policy-oriented synthesis in the field of military education. Data were systematically retrieved from searches conducted across Google Scholar, ResearchGate, RAND, DTIC, NATO repositories, the Scientific Information Database of Jihad Daneshgahi (SID), and MagIran, covering the period 1996–2025. Priority was accorded to peer-reviewed articles, official documents, and relevant empirical works. Thematic analysis was employed to juxtapose global benefits and challenges against Iranian realities, including Islamic-Iranian identity, resource limitations, and doctrinal priorities. The principal limitations of the study lie in its reliance upon secondary sources and the paucity of Iran-specific empirical data concerning Problem-Based Learning.

Results

Global Experiences of Problem-Based Learning in Professional Military Education

International implementation of Problem-Based Learning in professional military education has yielded measurable gains in higher-order cognitive skills and learner engagement, yet persistent implementation challenges underscore the necessity of contextual adaptation (Johansen et al., 2021; Goldman et al., 2024). Among the most significant and well-documented experimental applications is the study conducted at the Norwegian Defense University, which integrated Problem-Based Learning with elements of the flipped classroom within a military leadership

course. The results demonstrated statistically significant improvements in problem-solving ability, collaborative competencies, and self-directed learning among participating officers—outcomes that align directly with the requirements of mission-oriented command in decentralized operations (Johansen et al., 2021). Participants also reported deeper integration of theory and practice as well as heightened motivation for learning. The researchers nonetheless emphasized that the success of the approach depends critically upon instructors' capacity to guide and facilitate PBL sessions and upon the quality of problem design.

Notwithstanding these positive findings, the Norwegian study, like many comparable investigations, was small-scale and confined to a single course, lacking longitudinal follow-up of officers' actual operational performance in the field—an omission that substantially constrains the generalizability of the results (Johansen et al., 2021; Duraid & Annen, 2019; Anstad, 2025). This methodological limitation characterizes much of the military education research literature and indicates that the existing evidence base remains insufficient to support large-scale policy adoption.

In the United States, the utilization of Problem-Based Learning approaches in senior service colleges has been associated with enhanced strategic thinking and a strengthened sense of professional belonging among participants (Jenner & Hennessy, 2021). RAND Corporation reviews of the U.S. Armed Forces professional military education system have likewise underscored the necessity of transitioning from traditional, passive methods toward active, learner-centered approaches in order to cultivate intellectual agility across the organization (Goldman et al., 2024). At the international level, the NATO Defense Education Enhancement Program has supported the expansion of such instructional methods through curriculum reform assistance, scenario-based learning, and investment in faculty skill development (Iskandarov, 2023). Despite these institutional endorsements, the empirical evidence remains predominantly in the form of case studies and small-scale pilot implementations; few studies have examined the long-term effects of the approach upon actual command performance in real operational conditions.

The empirical evidence base in this domain therefore remains limited and inadequate. The majority of military studies are small-scale, rely heavily upon self-report measures, and lack longitudinal tracking of officers' field performance. Methodologically, confounding variables such as participants' prior experience or instructor motivation have not been adequately controlled, and

the transfer of learning to high-stakes, complex command decisions has received insufficient attention. Most critically, rigorous, systematic studies within non-Western military education systems—possessing strong ideological frameworks, hierarchical structures, and resource constraints—remain exceedingly rare (Duraïd & Annen, 2019; Anstad, 2025). These gaps indicate that even the transferable principles of Problem-Based Learning, such as authentic problem design, blended instructional structures, and sustained faculty support, require conscious and purposeful localization for effective adoption; localization that respects the organizational culture, value system, and operational realities of each nation.

The present article, by proposing a context-specific, localized framework for Iranian officer universities, represents an effort to address this very gap.

Adaptation to the Iranian Context: Challenges and Opportunities

The transfer of Problem-Based Learning to Iranian officer universities must be evaluated in light of the distinctive socio-cultural, organizational, and strategic characteristics of the Islamic Republic of Iran Armed Forces.

Opportunities

The emphasis within Problem-Based Learning upon active knowledge construction, collaborative inquiry, and problem-solving within authentic contexts aligns well with core features of Iranian military education. Professional military education in Iran has long prioritized operational readiness, collective identity derived from Basij and Islamic values, and ethical decision-making under conditions of ambiguity—foundations that Problem-Based Learning can reinforce rather than supplant.

Moreover, the recent expansion of simulation-based training, e-learning platforms, and research-oriented approaches has created a favorable substrate for the implementation of blended models. The approach also holds the potential to contribute to the preparation of officers capable of managing hybrid threats, cognitive warfare, and complex command challenges within a coherent value framework. This characteristic resonates with Iran's strategic doctrine, which emphasizes asymmetric capabilities and resistance to soft warfare.

When problems are designed in an authentic and contextually grounded manner, this methodology not only preserves but can actively strengthen Islamic-Iranian identity.

Challenges

Several structural and cultural barriers render the direct adoption of Problem-Based Learning problematic. One of the most significant obstacles is the prevailing educational culture in many military institutions, wherein the instructor continues to be regarded as the principal and almost exclusive source of knowledge. This perspective stands in direct tension with the instructor's role as guide and facilitator and with the emphasis upon learner autonomy and self-direction inherent in Problem-Based Learning.

From a structural standpoint, substantial challenges also exist. Large class sizes, inadequate or insufficient infrastructure for collaborative work and simulation, and limited access to diverse, up-to-date educational resources impede effective implementation. Furthermore, the design of authentic military problems that are both operationally valid and consistent with the official principles, regulations, and security considerations of the armed forces requires specialized expertise and curricular planning experience.

Transformation of the assessment system is equally necessary yet complex. Current assessment traditions, which center predominantly upon standardized tests, must evolve toward more diverse, performance-oriented methods such as portfolios, reflective reports, and simulation-based evaluation—without compromising educational accountability or the value coherence of learners. Additionally, concerns may arise regarding the importation of educational assumptions and perspectives that may not align with the values and intellectual framework of the armed forces. It is therefore essential that the localization process incorporate explicit safeguards to preserve ideological and cultural identity.

Principles of Localization

Effective localization of Problem-Based Learning rests upon three interrelated principles. First, problem authenticity must be defined in contextual terms. Scenarios and problems should reflect Iranian operational art, defensive strategies, hybrid threats, and ethical frameworks derived from Islamic-Iranian sources, rather than merely adapting foreign case studies.

Second, the instructional approach should be designed in a blended manner that preserves respect for legitimate hierarchy while simultaneously fostering guided learner independence. This feature accords with cultural expectations in military educational settings, where instructor guidance and direction occupy an important position.

Third, value integration must be explicit and continuous. In every Problem-Based Learning cycle, participants should be required to articulate clearly how their proposed solutions align with or are constrained by fundamental national and religious principles.

Taken together, these three principles transform Problem-Based Learning from an imported methodology into a native, contextually embedded approach that is compatible with Iran's educational, value-based, and operational realities.

Proposed Localized Model: The Iranian Military Problem-Based Learning Framework (PBL-IMAF)

Drawing upon the international evidence and preceding contextual analysis, this article proposes the Iranian Military Problem-Based Learning Framework as a modular, phased model for integrating Problem-Based Learning into Iranian officer universities. The framework comprises five interdependent components designed to align with Islamic-Iranian values, the operational requirements of the armed forces, and existing institutional realities.

1. Authentic Problem Design

A cornerstone of the framework is “authentic problem design.” An authentic problem is one that emerges from the operational and command realities of the Iranian armed forces rather than being merely adapted from external sources or experiences. The model aims to establish a coherent repository of genuine, context-specific problems. Such problems should possess several core attributes:

- **Grounded in field realities:** The problem should incorporate authentic dimensions of military operations, including logistics, intelligence, man oeuvre under complex and contested conditions, and decision-making in high-risk situations.
- **Possess an ethical and value dimension:** The problem should encompass ethical considerations rooted in Islamic-Iranian ethics and the culture of martyrdom, thereby drawing officers toward value-oriented reflection.
- **Aligned with doctrine and national priorities:** Proposed solutions should be compatible with the official principles and strategies of the Iranian armed forces.

When problems are designed in this manner, they not only strengthen officers' analytical and decision-making competencies but also contribute to the formation of their professional and value-

based identity. Problems lacking authenticity and contextual grounding typically fail to resonate with Iranian officers and exert limited educational impact.

2. Blended Instructional Structure

The instructional sequence within this framework consists of three mutually reinforcing components designed to achieve an appropriate balance between theoretical knowledge acquisition and practical experience. The structure is predicated on the premise that deep, durable learning occurs when learners possess sufficient foundational knowledge prior to confronting a problem, subsequently engage in collaborative analysis and resolution, and ultimately test their solutions in environments approximating reality.

- **Pre-class preparation (flipped classroom):** Prior to attending the instructional session, learners' study foundational concepts and theoretical knowledge through structured digital modules or official texts and strategic documents of the armed forces. This phase reduces learners' cognitive load during the main session and permits greater allocation of time to analysis, discussion, and argumentation. Absent such preparation, PBL sessions risk devolving into mere transmission of foundational knowledge rather than deep inquiry.
- **Facilitated Problem-Based Learning sessions:** In these sessions, small groups (preferably six to eight participants) analyses the problem, identify their knowledge gaps, conduct collaborative research and investigation, and formulate practical solutions. The instructor's role in this phase is to guide the reasoning process, pose facilitative questions, and manage group interaction—rather than to transmit knowledge directly. This design rests on the logic that deep learning emerges when learners actively participate in the knowledge-construction process.
- **Integration of simulation and field components:** Proposed solutions are tested and refined within war-gaming simulations, virtual simulations, or field exercises. This stage closes the loop between theoretical analysis and actual performance, enabling evaluation of the operational effectiveness of solutions under conditions approximating the field. Without such integration, there exists a risk that learning remains at an abstract level and fails to transfer to operational performance.

This blended structure maximizes active learning time while managing resource and infrastructure constraints, thereby establishing an appropriate equilibrium among theoretical knowledge, collaborative analysis, and practical experience.

3. Faculty Development Program

Effective and sustainable implementation of Problem-Based Learning depends, above all, upon instructor capability. International research consistently identifies inadequate instructor preparation for the facilitator role—rather than the traditional lecturer role—as one of the principal barriers to successful adoption. Consequently, the faculty development program within this framework constitutes not a peripheral activity but a central pillar of success.

The program should address four principal axes:

- Theoretical foundations and techniques for facilitating Problem-Based Learning sessions;
- Authorship and adaptation of context-specific problems aligned with Iranian operational and value-oriented realities;
- Cultural guidance that establishes an appropriate balance between instructor direction and guided learner independence;
- Design of performance-oriented assessment systems capable of measuring both analytical skills and value coherence.

The creation of initial cohorts of trained pioneer instructors who subsequently function as peer mentors can generate a cascading professional development model. This model is compatible with the hierarchical structures existing within officer universities and facilitates the gradual, organization-wide dissemination of competencies. Without substantial investment in this domain, even the most meticulously designed curriculum will encounter resistance or suboptimal quality during implementation.

4. Culturally Aligned Assessment System

The assessment regime must align with the learning objectives of Problem-Based Learning. Traditional assessments, which center predominantly upon standardized tests and the measurement of rote knowledge, are ill-equipped to capture higher-order competencies such as problem analysis, teamwork, ethical reasoning, and decision-making under ambiguity. Transformation of the assessment system is therefore not a matter of preference but a methodological necessity.

The proposed assessment system comprises four complementary instruments:

- **Individual and group portfolios** that document the reasoning process, iterations, and refinements of solutions. This instrument enables the tracking of learners' intellectual development over time.

- **Peer and self-assessment protocols** consistent with military teamwork standards. This method simultaneously strengthens collaborative competencies and cultivates a culture of constructive feedback among officers.
- **Performance assessment in simulations and field exercises**, employing evaluation rubrics that encompass operational effectiveness, ethical coherence, and alignment with official and strategic principles of the armed forces. This instrument measures the transfer of learning to actual performance.
- **Reflective journals** in which learners are required to articulate explicitly how their learning experiences intersect with their professional identity and Islamic-Iranian values. This instrument transforms value integration from a rhetorical level to a reflective and evaluable one. A reflective journal is a personal, systematic record maintained by the learner (officer) following each session or learning experience. In these entries, the learner does not merely record what has been learned but reflects upon it, analyses it, and connects it to their professional life and personal values. In other words, the reflective journal constitutes a space in which the learner engages in internal dialogue: “What did I learn today? How does this relate to my work as an officer? To what extent does this solution align with my Islamic-Iranian values and principles?”

This system preserves educational accountability while simultaneously reinforcing the metacognitive and ethical growth that constitute central pillars of Problem-Based Learning.

5. Explicit Values Integration Mechanism

A distinguishing feature of this framework is the incorporation of explicit, systematic mechanisms for strengthening Islamic-Iranian identity across all components. Localization at the superficial level (such as altering nomenclature or examples) is insufficient and may result in tokenism. Value integration must therefore be intentional, transparent, and traceable.

To achieve this objective, three principal mechanisms are envisaged:

- Problem prompts and questions should incorporate value-oriented reflective queries, thereby compelling learners to consider the alignment of proposed solutions with fundamental national and religious principles.
- Facilitation guides should encourage instructors to raise, in a respectful and constructive manner, potential tensions between operational solutions and value principles. This prevents values from becoming a marginal concern.

- Assessment rubrics should allocate explicit weighting to ethical, official, and strategic coherence with the armed forces, rendering this dimension serious and measurable for both learners and instructors.

This explicit and systematic integration distinguishes the Iranian Military Problem-Based Learning Framework from generic Western models and ensures that the localization process is realized not merely at the structural level but also in the depth of content and values. Absent such a mechanism, there exists a risk that an imported approach, albeit superficially localized, may undermine officers' value identity.

Phased Implementation Roadmap

Successful implementation of the Iranian Military Problem-Based Learning Framework requires a staged, realistic, and continuously evaluated process. The roadmap is predicated on the understanding that pedagogical transformation in military environments—owing to structural, value-based, and operational sensitivities—cannot occur abruptly or in a single stroke. The implementation process is therefore structured in four phases, each building upon the achievements of the preceding stage and permitting refinement and adaptation throughout the trajectory.

Phase One — Preparation (6–12 months)

In this phase, the principal focus lies upon establishing the necessary infrastructure for successful implementation. Key activities include comprehensive needs assessment within selected universities, identification of gaps in existing curricula and instructor capabilities, development of an initial repository of context-specific problems and instructional modules, and the selection and training of experimental cohorts of instructors.

This phase is of critical importance because, without precise understanding of the actual needs and capacities of the universities, the design of problems and instructional program may lack alignment with field and organizational realities. Furthermore, initial instructor training during this phase mitigates potential resistance in subsequent stages and establishes a foundation for the gradual expansion of competencies. Absent this phase, the risk exists that pilot implementation will encounter poor quality or organizational resistance.

Phase Two — Controlled Pilot Implementation

During this phase, the approach is implemented in a controlled and limited manner across two to four courses, spanning different branches or educational levels (for example, one tactical and one

operational course). Assessment in this phase is multi-dimensional and includes pre- and post-tests of critical thinking, systematic collection of feedback from learners and instructors, and examination of actual performance indicators.

Controlled pilot implementation permits the identification of the model's strengths and weaknesses under realistic conditions without exposing the entire educational system to risk. The phase also affords an opportunity to test context-specific problems, evaluate instructor readiness, and examine learner responses. Data derived from this phase will inform necessary refinements prior to scaling.

Phase Three — Gradual and Iterative Expansion

Following evaluation and refinement of the model based upon data from the pilot phase, the approach is expanded gradually to additional courses and institutions. In this phase, the establishment of institutional support structures—such as appropriate scheduling, targeted resource allocation, and the institution of quality assurance mechanisms—assumes particular significance.

Gradual, data-driven expansion prevents the imposition of excessive pressure upon the organization and permits continuous refinement. This iterative approach ensures that lessons learned at each stage contribute to improved quality of implementation in subsequent phases. Without the creation of institutional support structures, even the most meticulously designed model will encounter implementation difficulties and misalignment during expansion.

Phase Four — Institutionalization

In the final phase, the principles and structures of Problem-Based Learning are formally integrated into curricula, statutes, and armed forces education policy documents. Concurrently, sustained capacity for faculty development and research in this domain is established and consolidated.

Institutionalization represents the stage at which transformation advances from a project-based, experimental level to a structural and sustainable one. Absent this stage, achievements from preceding phases may dissipate with changes in management or priorities. Formal integration into higher-level policy documents guarantees organizational commitment and provides the foundation for continuity and ongoing improvement.

The modular design of this framework permits intelligent adaptation to the specific requirements of each branch of the armed forces (Army, Navy, Air Force, and Islamic Revolutionary Guard Corps) and to different levels of officer education. This characteristic transforms the framework

from a uniform, imposed model into a flexible, adjustable approach capable of accommodating the organizational and educational diversity of Iran's armed forces without compromising its core principles.

Discussion

The Iranian Military Problem-Based Learning Framework (PBL-IMAF) makes a substantial contribution both to the global literature on military pedagogy and to domestic efforts aimed at modernizing officer education in Iran. By synthesizing international evidence concerning the effectiveness of Problem-Based Learning in cultivating adaptive, collaborative, and self-directed competencies with a rigorous analysis of Iran's specific conditions, the framework demonstrates that global pedagogical principles can be localized in a manner that not only avoids conflict with national values and the operational priorities of the armed forces but actively reinforces them.

From a theoretical perspective, the framework advances understanding of the localization process in professional military education by one significant step. Many prior studies have merely emphasized the necessity of "contextual sensitivity" without specifying its operational mechanisms. The PBL-IMAF framework, however, moves beyond general recommendations by defining precise criteria for authentic problem design, blended instructional structures, and value-integration protocols, thereby achieving a practical and testable architecture. This feature enables future empirical examination and iterative refinement of the model.

From a practical standpoint, the framework offers policymakers and curriculum designers in Iranian military education a relatively clear pathway. This pathway facilitates the preparation of officers who are both competent in volatile, uncertain, complex, and ambiguous environments and deeply committed to Islamic-Iranian identity and national strategic principles. This precise combination is precisely what is required to confront contemporary asymmetric and hybrid threats. Absent such an approach, the risk exists that officer education will either remain excessively traditional and non-adaptive or, in the process of modernization, drift from foundational values. Several important limitations nevertheless require candid acknowledgement. First, the proposed framework has not yet undergone empirical validation within Iranian educational environments. Consequently, its actual impact upon officer performance indicators—such as decision-making quality under pressure, ethical judgement, and unit cohesion—must remain provisional pending

rigorous pilot studies. Second, resource constraints (including simulation facilities and instructors' discretionary time for professional development) may limit the intensity and quality of full model implementation during initial stages. Third, cultural resistance to the transition from the traditional instructor role to that of facilitator may, in the absence of appropriate change management, slow the pace of adoption. Finally, the generalizability of this model is likely higher in military education systems sharing similar characteristics, such as emphasis on values, resource constraints, and respect for hierarchy. Transfer to substantially different contexts would require further adaptation.

Unexpected findings in the global literature also carry important lessons for the implementation of this framework. In particular, instructor readiness and motivation, together with the quality of authentic problems, exert far greater influence upon the success of the approach than initially anticipated (Priest & Beach, 2022). This indicates that pedagogical transformation is not merely a curricular issue but equally a matter of change leadership and human resource management (Fullan, 2019). There is also the possibility that a portion of the reported gains in studies derive not solely from the Problem-Based Learning approach itself but from increased instructor motivation or more effective resource allocation within pilot projects. These considerations underscore the necessity of phased implementation, continuous evaluation, and avoidance of premature generalization of results.

Future research should pursue several principal axes. First, quasi-experimental or mixed-methods pilot studies within Iranian officer universities are essential to assess not only short-term learning outcomes but also the extent of learning transfer to operational readiness indicators and the long-term development of officers' professional and value-based identity (Hattie, 2023). Second, comparative studies among different Iranian officer universities and, subsequently, with educational program in countries possessing analogous conditions, can clarify boundary conditions and limits to generalizability. Third, investigation of the potential extension of this framework to other specialized domains, such as foreign language education for officers or technical branch training, can broaden the scope of its impact. Finally, in-depth qualitative research concerning the lived experience of instructors and learners throughout the implementation process can substantially enhance understanding of the barriers and facilitators of localization.

Overall, although the PBL-IMAF framework still requires empirical testing, it possesses the capacity to serve as a practical, indigenous model for the transformation of professional military education in Iran—provided that its implementation is accompanied by precision, appropriate phasing, and continuous evaluation.

Conclusion and Policy Recommendations

This analytical review has demonstrated that Problem-Based Learning, when appropriately and carefully localized through the Iranian Military Problem-Based Learning Framework (PBL-IMAF), can furnish a practical and high-potential pathway for pedagogical transformation within the officer universities of the Islamic Republic of Iran. By cultivating critical thinking, collaborative problem-solving, and self-directed learning within a context explicitly aligned with Islamic-Iranian values and the operational priorities of the armed forces, the framework directly addresses serious deficiencies of traditional lecture-based education and prepares officers to confront the complexities of contemporary and future operational environments.

The international evidence base, although stronger and more extensive in Western contexts, offers transferable principles that, through intelligent adaptation, can accelerate the development of adaptive, value-oriented military leaders. The proposed framework's emphasis upon authentic problem design, blended instructional structures, faculty development, culturally responsive assessment, and explicit value integration provides a practical blueprint in which innovation and fidelity to national priorities stand in balanced relation. Absent such equilibrium, efforts to modernize military education risk either superficiality or confrontation with organizational and value-based resistance.

To realize this potential and convert the framework from a theoretical proposal into genuine, sustainable transformation, the following policy and practical recommendations are advanced:

1. Institutionalize the principles of Problem-Based Learning

The principles of this approach should be formally incorporated into national curricula for professional military education and into the strategic documents governing armed forces education. This measure not only signals high-level organizational commitment but also enables resource allocation, administrative restructuring, and the establishment of implementation mandates. Absent formal institutionalization, even the most promising pilot models remain vulnerable to shifts in priorities and managerial preferences.

2. **Establish faculty development program**

Successful implementation of Problem-Based Learning depends, above all, upon the transformation of the instructor's role from knowledge transmitter to facilitator of the learning process. Accordingly, faculty development program should be designed and implemented as mandatory initiatives accompanied by appropriate incentives. These programs should focus upon facilitation of Problem-Based Learning, the design of context-specific problems, and culturally aligned guidance, commencing with experimental cohorts of senior instructors. Without substantial investment in this domain, even the most meticulously designed curriculum will encounter suboptimal quality or resistance during implementation.

3. **Launch rigorously evaluated pilot program**

Prior to widespread expansion, rigorously evaluated, controlled pilot program should be launched at flagship institutions such as Shahid Sattari Officer University. These programs should employ mixed-methods research designs and include pre- and post-test measurements of critical thinking, problem-solving, and value integration. The objective of this stage is to generate practical, credible evidence for model refinement prior to scaling—not merely to conduct demonstrative pilot implementations.

4. **Allocate targeted resources**

Effective implementation of this approach requires collaborative learning spaces, simulation capabilities, and appropriate digital platforms. Resource allocation should be intelligent and phased so as to avoid the imposition of heavy and unnecessary costs. Priority should be accorded to maximizing utilization of existing infrastructure and to the gradual development of new capabilities, rather than to the creation of new, costly infrastructure at the outset.

5. **Launch longitudinal research program**

To ascertain the actual effectiveness of the framework, longitudinal research program should be designed and implemented to measure its impact upon officer performance, ethical decision-making quality, and operational readiness. The findings of these studies should be systematically fed back into model refinement and improvement. Absent such a feedback loop, the risk exists of perpetuating an ineffective or operationally misaligned model.

6. **Promote structured knowledge exchange**

The establishment of regular mechanisms for the exchange of experience and knowledge among

officer universities, different branches of the armed forces, and, where appropriate, relevant civilian institutions can accelerate organizational learning and prevent the repetition of errors. This exchange should be purposeful and structured rather than consisting merely of informal, sporadic meetings.

Coordinated, phased implementation of these recommendations under the guidance of the Iranian Military Problem-Based Learning Framework can substantially enhance the quality and relevance of officer education in the Islamic Republic of Iran. Pedagogical transformation in military education under current conditions is not merely an educational reform; it constitutes a strategic imperative for the preparation of commanders capable of rendering effective decisions in volatile, uncertain, complex, and ambiguous environments while simultaneously preserving and strengthening the foundational values and Islamic-Iranian identity that define Iran's armed forces. Future empirical work to test, refine, and continuously improve this model will be the necessary condition for converting this potential into enduring institutional excellence.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of Tehran University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection, and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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