



ORIGINAL RESEARCH ARTICLE

**Integrating Instructional Technology and Coaching to Enhance
Professional Learning Spaces in High-Risk Petrochemical
Environments**

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ABSTRACT

The integration of Artificial Intelligence (AI)—specifically Large Language Models (LLMs) and Graph Neural Networks (GNNs)—has fundamentally transformed knowledge processing in higher education. Despite rapid adoption, a critical gap exists between technological capability and institutional implementation. This systematic literature review investigates the mechanisms of AI-driven knowledge processing at both micro and macro levels within academic settings. Adhering to the PRISMA framework, this study synthesizes 56 peer-reviewed articles selected from an initial database of 9,894 records to identify key trends, pedagogical implications, and organizational challenges.

Findings reveal that while AI enhances decision-support systems and personalized learning, its deployment is hampered by issues of data governance, algorithmic bias, and institutional heterogeneity. The analysis demonstrates that effective knowledge processing requires a shift from mere adoption to a strategic, AI-governance-centered approach. Furthermore, the results highlight a significant lack of model robustness analysis, suggesting that future research must prioritize the stability and long-term sustainability of AI applications in academic curricula. This paper contributes to the field by providing a comprehensive framework for institutional decision-makers to navigate the complexities of AI integration, ultimately bridging the gap between theoretical knowledge processing and practical, actionable educational strategies.

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Introduction

In the era of digital transformation, the concept of “Learning Spaces” has moved beyond the traditional confines of classrooms to become fluid, distributed, and technology-driven ecosystems. In high-risk industries such as petrochemicals, the real workplace serves as a “professional learning space” where knowledge transfer, operational safety, and productivity are intertwined. However, the existing literature on Instructional Technology often focuses on academic or public settings and has less addressed the complexities of learning spaces in process industries. Recent research suggests that the connection between digital tools and human interactions is a necessary prerequisite for creating effective learning spaces in complex workplaces (Garrison, 2017).

One innovative approach to enhancing these spaces is the “Coaching-Oriented Organization” model. Coaching in this context is no longer simply a consulting process, but is known as a “Computer-Mediated Learning Environment” that facilitates professional interactions among employees.

According to studies by Mahdavi Parsa and Nastizai (2024), the establishment of this model in large organizations requires a change in communication paradigms; an approach that Saghaei et al. (1403) consider essential for achieving sustainable organizational development. However, the challenge in the petrochemical industry is the transition from face-to-face coaching to distributed learning spaces in which new technologies play the role of “facilitator” (Siemens, 2005). The integration of educational technologies with coaching structures allows the creation of “Safety-Critical Learning Spaces”; Spaces where employees can learn and acquire skills in simulated environments (Simulations) or virtual reality (VR), without risk to life or money. Despite the need to combine these two areas, there is a deep gap in the existing literature to provide a comprehensive model. Petrochemical organizations often face the gap of a technological roadmap for implementing coaching that simultaneously addresses digital infrastructure, safety standards (HSE) and human competency development. Aiming to fill this gap, this study seeks to design a coaching-oriented organization model with an approach based on educational technologies.

Using thematic analysis (Braun & Clarke, 2006), this study has extracted 11 overarching themes that redefine learning spaces in the petrochemical industry. This model not only focuses on human resource management structures, but also emphasizes the integration of digital platforms, computer-mediated communications, and collaborative learning systems.

The results of this research provide operational strategies for managers and educational technology professionals to design “coach-oriented professional learning spaces” to enhance organizational productivity in the most hazardous industrial environments.

Literature Review

Theoretical foundations and research background The concept of coaching in the management and training literature has evolved from a simple approach to improving performance to the creation of “learning ecosystems”. In this regard, the definition of coaching is considered beyond a management style as a tool to facilitate learning in complex environments (Williams & Loman, 2018; Macky, 2014). From a pedagogical perspective, coaching can act as a platform for “situated learning” in which knowledge is transferred through interaction in operational environments (Al-Nasser & Behari, 2015).

1. Coaching effectiveness and organizational outcomes

Research background shows that coaching effectiveness is based on three main pillars: competencies, behaviors, and performance outcomes (Jarossez & Kartur, 2025). Meta-analytic studies also confirm that coaching is generally associated with positive outcomes in workplaces (Kanov-Bavers et al., 2023). These outcomes are particularly important in strategic and high-risk industries; as Irvan-Vusi and Ekouzor (2025) observed in their study of the oil and gas industry, a direct link between coaching and improved operational

efficiency and profitability. In addition, team coaching can enhance organizational health and team synergy by improving interactions between supervisors and subordinates (Hajil et al., 2018).

2. Coaching as a platform for organizational learning and change

In the process of organizational transformation, coaching plays a key role in “capacity building” and “problem solving” (Feldman et al., 2023). This process is not limited to knowledge transfer, but can also improve job performance by strengthening positive relationships and organizational support (Nguyen et al., 2024). Meanwhile, transformational leadership can double the effectiveness of informal coaching as a moderating factor in improving employee performance (Nguyen et al., 2024). Studies conducted in the context of Iranian organizations also indicate attention to the importance of coaching in various fields, including environmental organizations (Dadkhah Aghdash et al., 1404), academic centers (Saghafi et al., 1403) and educational environments (Mahdavi Parsa & Nasti-zaei, 1403). Also, the role of coaching in improving leadership behaviors (Aref-Nejad et al., 1403), improving operational skills (Golparvar et al., 1402), and reducing deviant behaviors in the organization (Rafti & Samadi, 2019) has been emphasized. However, given the specific and risky nature of the petrochemical industry, there is an increasing need to review coaching models with a focus on “technological learning spaces” and “distributed learning environments.” Taking a comprehensive look at the research background, while the effectiveness of coaching in improving organizational performance and developing individual competencies has been proven time and again, there is still a deep theoretical and practical gap in the existing literature.

Most previous studies have analyzed coaching mainly in traditional human resource management frameworks or in general educational contexts and have neglected to examine “coaching as a technology-driven learning space” in strategic and high-risk industries (such as petrochemicals). However, in complex operational environments, mere verbal managerial interactions are not sufficient; rather, there is a need to create “distributed learning spaces” and utilize “technological tools” to facilitate on-the-job learning. Therefore, the present study aims to fill this gap by presenting a “coach-oriented organization” model with an innovative approach focused on “educational technology” to explain and present the context of “sustainable learning spaces” in the petrochemical industry, while moving beyond a purely managerial perspective.

Method

This research was conducted using a qualitative paradigm and an interpretive approach. Given the exploratory nature of the subject (presenting a model of a mentor-oriented organization in high-risk industrial environments), the “Thematic Analysis” method was used to identify the experts’ mental patterns and explain the dimensions of the proposed model. This method was chosen because of its flexibility in decoding lived experiences and identifying hidden patterns in “learning and educational spaces.” Data Analysis Process Data analysis was conducted based on Brown and Clark’s (2006) six-step framework. The analysis process was a continuous back-and-forth cycle between raw data and theoretical concepts. In the first step, the interview transcripts were reread repeatedly to gain a general understanding of the content. Then, meaning units representing dimensions of coaching, technological tools, and learning space infrastructure were extracted and coded. Final themes were developed through the classification of initial codes and with an inductive (derived from petrochemical environment data) and deductive (in accordance with the learning space literature) approach. Population and Participants The statistical population consisted of 11 academic experts and senior human resources managers in the petrochemical industry who were selected using purposive sampling. The selection criteria for participants were having a managerial background in implementing educational systems and operational experience in high-risk industrial environments so that they could provide the most accurate perspectives on

“distributed learning spaces.” The data collection tool was semi-structured interviews, which allowed the researcher to reach deeper layers of operational learning challenges with probing questions. Trustworthiness To ensure the validity and reliability of the findings, “External Audit” techniques by educational technology experts and “Member Checking” were used. This process ensured that the extracted themes accurately reflected the professional experiences of the participants in the context of industrial learning environments.

Findings

The data for the first phase were extracted from the segmented text. A sample of the extracted codes is presented in Table 1.

Table 1. Sample of summarized and segmented text

Overarching Theme	Core Themes	Summarized and Categorized Text
Philosophy and Strategic Orientation of a Coach-Oriented Organization	Viewing Coaching as a Developmental Intervention	At the complex, we do not view coaching as a luxury program or an end-of-year reward; rather, we regard it as a surgical intervention to bridge skill gaps during operational crises. When a responder falters, timely coaching serves as the very intervention that averts a major system shutdown.

The extracted basic concepts were categorized based on the analysis model into three levels: global, organizing, and basic themes. Table 2 presents the components extracted through this categorization.

Table 2. Global, organizing, and basic themes of the coach-oriented organization model.

Overarching Theme	Organizing Theme	Core Theme
Philosophy and Strategic Orientation of the Coaching-Oriented Organization	Coaching as a Strategic Intervention	Coaching and developmental intervention
		Performance improvement through coaching
		Human capital retention via coaching
		Development of key personnel
		Linking individual development to organizational outcomes
		Leader development using a coaching approach
	Philosophy of Human Growth and Development	Belief in employee developability
		Supporting self-transformation
		Fostering self-direction
		Emphasis on continuous growth
		Unlocking employee potential
		Transitioning from dependence to independence
	Organizational Value Creation	Creating value for the client
		Creating value for the organization
		Enhancing organizational competitive advantage
		Developing organizational capabilities
		Strengthening organizational capacity for change
		Sustaining developmental outcomes
	Alignment with Petrochemical Industry Strategy	Aligning coaching with corporate strategic goals
		Aligning coaching with HSE requirements
		Aligning coaching with production sustainability
		Supporting process reliability
		Strengthening production chain resilience
		Supporting physical asset productivity
	Process-Oriented and Goal-Oriented Approach	Defining coaching as a structured process
		Adopting a process-oriented and goal-oriented coaching approach
		Orienting coaching toward specific, clear goals
		Emphasizing the achievement of measurable results
		Continuously monitoring progress
		Fostering self-regulation in goal achievement
Organizational Culture and Climate Supporting Coaching	Culture of Continuous Learning	Supporting continuous workplace learning
		Leveraging work interactions and experiences to develop knowledge and skills
		Encouraging professional growth and advancement
		Embracing change and adapting to new conditions and needs
		Continuously reflecting on performance and identifying areas for improvement
		Transforming work experiences into opportunities for learning and individual/organizational development
	Culture of Dialogue and Feedback	Institutionalizing a culture of receiving and providing growth-oriented feedback
		Facilitating dialogue regarding performance barriers
		Promoting constructive dialogue and the exchange of professional perspectives
	Climate of Trust and Psychological Safety	Continuous support for learning and professional development
		Leveraging work interactions to enhance knowledge

		Embracing change and adapting to new conditions
		Continuously reflecting on performance and reviewing processes
		Turning daily experiences into learning opportunities
	Culture of Accountability	Commitment to development goals
		Taking responsibility for actions
		Following up on meeting agreements
		Commitment to professional self-monitoring
		Acknowledging one's role in performance improvement
		Accountability for results and consequences
	Culture of Learning from Mistakes	Blame-free reporting
		Analyzing errors for learning purposes
		Open and transparent dialogue regarding near-misses
		Constructively accepting safety-related feedback
		Systematic analysis of errors to deepen learning
	Culture of Cross-Unit Collaboration	Transforming incidents into practical lessons learned
		Strengthening cross-functional dialogue
		Sharing operational knowledge
		Reducing functional conflicts
	Climate of Organizational Support	Cross-unit problem solving
		Reinforcing shared responsibility
		Supporting coaching activities
		Positively reinforcing desired behaviors
		Employee access to development opportunities
		Supporting sustained change
		Addressing employees' developmental needs
Leadership and Managerial Support	Senior Management Support	Senior management commitment to coaching
		Formal support for coaching programs
		Strategic use of coaching
		Institutionalizing coaching
		Supporting leadership development
	Development-Oriented Leadership	Modeling coaching behaviors
		Leaders focusing on employee development
		Supporting professional growth
		Enhancing employee capabilities
		Facilitating self-transformation
	Facilitative Leadership	Nurturing future leaders
		Ensuring leadership continuity
		Shifting from directing to facilitating
		Gradually reducing direct guidance
		Asking questions instead of providing ready-made answers
	Manager as Coach	Empowering employees
		Facilitating problem solving
		Delegating responsibility for action
		Managers employing coaching skills
		Developmental dialogue between managers and employees
Coaching Structure and Governance	Formal Coaching Structure	Providing continuous feedback
		Supporting employee goal setting
		Turning management meetings into learning opportunities
		Coaching in the workflow
		Allocating formal time for coaching
	Governance and Policy-Making	Freeing up employees to attend sessions
		Supporting shift workers
		Prioritizing development alongside production
		Maintaining support during crises
		Removing implementation barriers for coaching
	Balancing Formal and Informal Coaching	Formally designing the coaching process
		Structuring coaching interventions
		Defining coaching implementation stages
		Integrating coaching with development programs
		Establishing monitoring mechanisms
	Confidentiality and Referral Principles	Defining implementation responsibilities
		Formulating an official coaching policy
		Establishing a coaching leadership committee
		Designating an organizational owner
		Developing operational guidelines
		Overseeing program quality
		Reporting results to senior management
		Conducting formal coaching sessions
		Utilizing day-to-day conversations
		Differentiating managerial coaching from professional coaching
		Defining the boundaries between coaching and mentoring
		Developing peer coaching
		Maintaining the confidentiality of participants' information
		Managing conflicts of interest
		Defining information access levels

		Designing a referral system for specialized issues
		Protecting operational information
		Defining exceptions to confidentiality
	Coaching Governance in Petrochemicals	Linking the coaching structure to Human Resources
		Coordinating with the HSE unit
		Involving operational and technical units
		Covering both corporate (staff) and operational (line) units
		Implementing coaching at operational sites
		Coordinating between headquarters and the complex
	Role and Responsibility Clarity	Defining the coach's role
		Defining the participant's role
		Defining the direct manager's responsibilities
		Defining the role of the Human Resources unit
		Defining the HSE unit's role regarding specialized matters
		Specifying the scope of responsibilities for all parties
HR Policies and Systems	Integrating Coaching with Human Resource Management	Viewing coaching as a human resource development practice
		Linking coaching to employee development
		Using coaching for employee retention
		Linking coaching to professional development
		Use in addressing poor performance
		Integration with leadership development
	Linking to the Employee Lifecycle	Using coaching for onboarding
		Supporting career development
		Performance correction
		Supporting career advancement
		Coaching during role transitions
		Coaching new hires
	Talent Management and Succession Planning	Identifying key talent
		Focusing on key employees
		Formulating individual development plans
		Preparing successors
		Developing leadership competencies
		Preparing for critical roles
	Performance Management and Evaluation	Setting performance goals
		Monitoring progress
		Providing performance feedback
		Correcting behavior
		Linking performance appraisal to growth plans
		Using appraisal results for development
	Compensation and Motivation System	Rewarding managers who foster development
		Encouraging coaching behaviors
		Incorporating employee development into manager evaluations
		Identifying effective coaches
		Providing incentives for knowledge transfer
		Avoiding rewards based solely on production output
	Job Competency System	Linking coaching to competency models
		Developing competencies for critical roles
		Closing competency gaps
		Assessing job readiness
		Developing supervisor competencies
		Continuously updating competencies
Resources, Infrastructure and Coaching Technology	Resource Allocation	Organizational investment in coaching
		Designing coach training programs
		Securing specialized personnel
		Allocating suitable space
		Ensuring sustainable resources
		Allocating financial resources
	Time Allocation and Accessibility	Allocating official time for sessions
		Flexible scheduling
		Ensuring access for shift workers
		Covering remote sites
		Preventing session cancellations due to production pressure
		Scheduling follow-up actions
	Coaching Service Delivery Method	Blended coaching
		Face-to-face coaching
		Selecting the appropriate method based on requirements
		Online coaching
		Individual coaching
		Group and team coaching
	Digital Infrastructure	Creation of a digital coaching platform
		Recording development goals
		Recording agreed-upon actions
		Progress monitoring dashboard
		Reminders for sessions and actions

	Data and Analytics Infrastructure	Digital data protection
		Using performance data for needs assessment
		Analyzing HSE data
		Analyzing production downtime
		Analyzing quality and energy consumption
		Identifying performance gaps
		Assessing trends and changes
Coach Selection, Competencies and Professional Ethics	Communication Competencies	Active listening
		Providing feedback
		Professional communication
		Relationship building
		Facilitating dialogue
		Effective questioning
	Analytical and Facilitative Competencies	Accurately identifying and defining issues
		Applying problem-solving solutions
		Capacity building and empowerment
		Facilitating the learning process
		Supporting critical reflection
		Guiding towards practical solutions
	Effective Coach Behaviors	Using targeted positive reinforcement
		Providing empathetic support to the client
		Modifying directive interventions
		Stimulating critical thinking
		Fostering autonomy
		Adopting a pragmatic approach
	Personal and Behavioral Competencies	Exercising patience regarding the learning and change process
		Empathizing with and understanding the client's situation, emotions, and needs
		Remaining open to diverse perspectives and experiences
		Maintaining behavioral consistency and fostering a sense of trust and security
		Demonstrating professional humility and acknowledging personal limitations
		Avoiding judgment and maintaining a respectful, impartial demeanor
	Ethical Competencies	Adhering to confidentiality principles
		Committing to professional accountability
		Upholding professional boundaries
		Ensuring transparency and honesty in reporting
		Refraining from the abuse of power
		Recognizing the distinctions between internal and external coaches and their respective roles
	Coach Selection	Matching the type of coach to the organization's context and needs
		Evaluating the internal coach's effectiveness in achieving organizational goals
		Engaging external coaches for senior executives and sensitive or strategic roles
		Utilizing internal coaches for day-to-day organizational issues and internal challenges
		A mix of internal and external coaches to leverage both organizational insight and an external perspective
		Coach-Coachee Fit
Alignment of the coach's expertise with professional and organizational needs		
Alignment with the developmental needs of the individual or organization		
Mutual acceptance and the establishment of a trust-based relationship		
Absence of conflicts of interest in the coaching process		
Flexibility to change coaches in cases of misalignment		
Coach's Industry Competence	Mastery of petrochemical industry processes	
	Full awareness of protection protocols and safety standards	
	Knowledge of process-related risks	
	Deep understanding of shift-work culture	
	Awareness of hierarchical and organizational structures	
	Ability to communicate effectively with the operational workforce	
Coach Professional Development	Specialized training and coach development	
	Validation and certification of qualifications	
	Continuous retraining and professional development	
	Professional supervision	
	Performance evaluation	
	Formation of a professional community of coaches	
Client Readiness and Accountability	Readiness for Coaching	Commitment to active participation
		Determination and intent to operationalize
		Acceptance of and trust in the development process
		Mental readiness for review and self-change
		Self-awareness regarding developmental needs

	Ownership of Development Goals	Courage to step out of the comfort zone	
		Active participation in goal setting and defining the growth path	
		Taking responsibility for acting on decisions and development plans	
		Persistent pursuit of goals until expected results are achieved	
		Self-regulation in behavior management	
		Gradual progression toward independence in decision-making and action	
		Accountability for commitments and adherence to agreements	
		Receptiveness to Feedback	Actively responding to feedback
			Reflecting on behavioral patterns
			Continuous performance improvement and correction
			Leveraging feedback for development
			Smart management of defensive reactions
			Actively seeking and requesting feedback
		Self-Awareness and Self-Direction	Self-knowledge and continuous assessment
			Ability to map out future paths and long-term developmental goals
			Capacity and will to make fundamental changes in thought and behavioral patterns
			Ability to execute plans and make decisions without direct supervision
			Ability to assess progress and proximity to goals
	Personal learning management		
	Operational Readiness	Accepting coaching in the operational environment	
		Accepting safety-related feedback	
		Readiness to learn from errors	
		Responsibility regarding protocols and guidelines	
		Participating in operational problem-solving	
Applying lessons learned to the workplace			
Quality of the Coaching Relationship	Developmental Relationship	Focus on interpersonal connection	
		Trust-based rapport	
		Supportive and facilitative approach	
		Core focus on the client's growth	
		Continuous and dynamic interaction	
		Mutual commitment	
	Relational Trust and Safety	Trust in the coach	
		Conversational safety	
		Confidentiality	
		Space to express vulnerability	
		Opportunity to discuss professional errors	
		Reduced fear of administrative consequences	
	Balancing Support and Challenge	Emotional and professional support	
		Positive reinforcement	
		Challenging assumptions	
		Encouraging problem-solving	
		Calling for action	
		Avoiding client dependency	
	Quality of Interaction	Client satisfaction with the coach	
		Satisfaction with the process	
		Relationship quality as an effectiveness factor	
		Maintaining communication	
		Timely coach responsiveness	
		Compatibility of communication style	
Boundary Setting in the Relationship	Distinguishing coaching from evaluation		
	Distinguishing coaching from therapy		
	Distinguishing coaching from specialized consulting		
	Preventing dependency		
	Setting mutual expectations		
	Managing power dynamics		
Coaching Relationship in a High-Risk Industry	Frontline employee trust		
	Opportunity to report human error		
	Distinguishing coaching from reprimand		
	Maintaining operational data confidentiality		
	Respecting frontline employee experience		
	Understanding operational environment pressures		
Coaching Implementation Process	Needs Assessment and Diagnosis	Identifying obstacles	
		Diagnosing performance issues	
		Determining development needs	
		Assessing the current situation	
		Competency gap analysis	
		Using performance and HSE data	
	Coaching Contract	Defining roles	
		Defining the relationship	
		Setting initial goals	
		Agreeing on confidentiality	
		Determining session duration and frequency	

	Establishing the Initial Relationship	Establishing success criteria
		Building a supportive relationship
		Building trust
		Clarifying expectations
		Attending to client needs
		Assessing mutual fit
		Creating psychological safety
	Diagnostic Conversation	Examining the issue
		Identifying obstacles
		Reflecting
		Developing personal perspective
		Asking exploratory questions
	Goal Setting and Action Planning	Discovering action options
		Setting specific goals
		Formulating action intentions
		Defining measurable outcomes
		Action planning
	Implementing the Intervention	Defining client responsibilities
		Establishing checkpoints
		Strengthening client skills and latent potential
		Paving the way for achieving excellence-oriented goals
		Behavior and action consolidation phase
		Active support during plan implementation
	Monitoring and Feedback	Supporting practical actions
		Reinforcing positive behaviors
		Continuous monitoring of meeting processes and execution steps
		Periodic assessment of progress toward goals
		Identifying the gap between the "desired state" and the "current state"
	Termination and Learning Transfer	Providing constructive, growth-oriented feedback based on objective evidence
		Readjusting plans and actions based on monitoring findings
		Recognizing and highlighting successes
		Gradually reducing the level of guidance
		Empowering the coachee to make decisions independently
	Coaching within the Petrochemical Operations Cycle	Taking a comprehensive look at the journey and acknowledging newly acquired capabilities
		Equipping the coachee to maintain performance without the coach
		Operationalizing lessons learned within the organization
		Developing a post-engagement plan
		Coaching prior to critical operations
Goal Setting, Feedback and Self-Regulation	Result-Oriented Goal Setting	Coaching during shift handovers
		Post-incident coaching
		Coaching during major overhauls/maintenance
		Coaching during startup and shutdown
		Coaching following HSE audits
	Developmental Feedback	Setting clear goals
		Defining career goals
		Establishing measurable outcomes
		Linking goals to development needs
		Translating goals into action
	Multi-Source Feedback	Revising goals based on progress
		Corrective feedback
		Performance feedback
		Reinforcing desired behavior
		Constructive dialogue
	Self-Regulation	Behavioral correction
		Using feedback for learning
		360-degree feedback
		Manager feedback
		Peer feedback
	Goal Indicators in the Petrochemical Industry	Subordinate feedback
		Internal customer feedback
		Feedback from technical and HSE units
		Self-monitoring of progress
		Independent action
		Behavior management
		Accountability for goals
		Self-directed correction
		Maintaining motivation for action
		Reducing human error
		Reducing unsafe behaviors
		Increase in near-miss reporting
		Increased adherence to guidelines
		Reduction in rework
		Reduction in preventable downtime

Based on the components categorized in Table 2, a thematic network has been schematically constructed; Figure 1 illustrates the relationships among these components and dimensions, organized according to global, organizing, and basic themes.

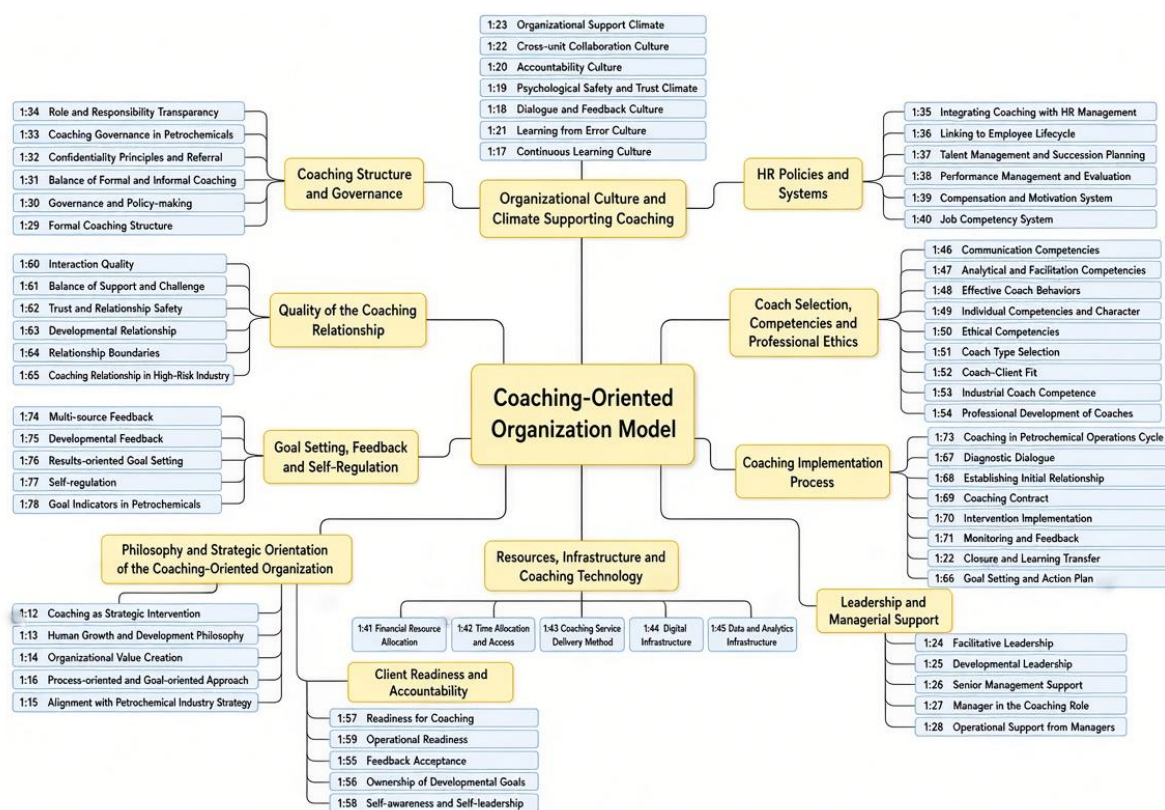


Figure 1. The relationships among components and dimensions

This study redefines the “coaching organization” model not only as a management tool, but also as a “distributed learning ecosystem” in the petrochemical industry. The findings show that the implementation of this model is based on four strategic axes: 1. Governance and structural infrastructure: Institutionalizing coaching in petrochemical sites requires a transition from informal approaches to systematic governance structures. The formulation of formal policies, the formation of a steering committee, and the clarification of roles (in the areas of production and HSE) provide the legal basis for this change. Management commitment in this model is not limited to mere verbal support; it also includes the formal allocation of working time to coaching and the remuneration of developing managers, which will ensure its operational continuity. 2. Educational Technology as a Learning Scaffold: One of the key findings is the necessity of digital transformation in the coaching process. The proposed model shows that “Hybrid Coaching” through digital platforms not only overcomes the geographical challenges of industrial sites, but also enables “Data-Driven Needs Assessment” using performance and HSE indicators. Technology here acts as an “Instructional Scaffolding” that establishes the connection between hard operational data and soft processes of human development. 3. Safety Pedagogy and Non-Blame Learning Culture: In the high-risk context of petrochemicals, coaching is tied to components such as “psychological safety” and “culture of learning from mistakes”. The findings emphasize that separating the “coaching process” from the “assessment and accountability systems” is a prerequisite for frontline staff trust. The coaching culture here is a factor in promoting “self-regulation” and changing the leadership style from “commanding” to “facilitating”, which directly leads to a reduction in unsafe behaviors and an increase in near-miss reporting. 4. Coaching competencies in the industry context: The effectiveness of coaching in these organizations requires a combination of general communication competencies with

specialized industry knowledge. The coach in this environment must have a deep understanding of “shift culture”, “HSE protocols” and “operational unit dynamics”. The final model shows that the success of the coaching process depends on the personality and expertise fit between the coach and the client, and at the same time, the flexibility of the system to change the coach based on the evolving needs of the client throughout the operational cycle.

Discussion

The model extracted in this research outlines a fundamental transition from traditional coaching to “systemic coaching” in high-risk industries. To operationalize this model, three strategic layers are proposed that will elevate petrochemical organizations from command management to learning organizations:

1. Governance, Policy, and Structure

Establishing coaching in petrochemical industries requires an infrastructure that goes beyond individual interventions. Organizations should establish this approach as a formal strategy by “developing a coaching philosophy statement” and forming an “inter-unit steering committee” (with representatives from production, maintenance, HSE, and human resources). This structure should be accompanied by “developing operational guidelines” to ensure confidentiality and ethical standards. In line with Mahdavi Parsa and Nastizaei’s (2014) view, such a structure ensures that coaching is not an ancillary activity but an integral part of the employee lifecycle, talent management, and organizational succession planning.

2. Integrated Operations and Psychological Safety

The findings of this study suggest that aligning coaching with performance indicators is crucial. Linking coaching to “key performance indicators (HSE and production KPIs)” and using it to reduce human error and improve physical asset productivity is key to operational managers’ acceptance of this model. This requires creating “psychological safety” by separating the coaching process from punitive evaluations and promoting a “culture of blameless reporting,” an approach that confirms the findings of Feldman et al. (2023) and Nguyen et al. (2024). Also, holding joint meetings for cross-unit knowledge sharing and allocating formal time for coaching (even for shift workers in remote sites) ensures the continuity of this process in conditions of operational pressure.

3. Digital transformation and competence development

The role of “educational technology” as the backbone of this model is reflected in the establishment of a “digital recording and monitoring system”; a platform that facilitates full access of employees to the learning processes. According to Jarosz and Carter (2025), these tools are effective when combined with “native competency models” (including industrial, communication and ethical skills) and “targeted training courses for managers and supervisors”. Finally, designing a reward system for development managers (managers who play a role in improving the skills of employees) will be the engine driving the coaching culture in the organization.

Conclusion

This study, by extracting 11 overarching themes in the form of 4 strategic layers, presented a comprehensive model of the “coach-oriented organization” in the petrochemical industry. The results showed that success in this area is conditional on synergy between management structures, digital tools and safety culture.

In order to realize this model, leading organizations should start the deployment process by “implementing a pilot” in operational units and periodically review and optimize the results

through an “effectiveness monitoring and evaluation system” (based on error reduction indicators and reporting). This learning model not only helps to improve individual skills, but also acts as a tool for managing physical assets and organizational resilience and provides an operational framework for the transition from traditional approaches to industrial intelligent organizations. The findings of this study, along with the citations of Saghafi et al. (1403) and Aghdash et al. (1404), are considered a comprehensive practical guide for senior managers on the path of cultural and digital transformation of organizations and open new horizons for future research in the field of learning in high-risk environments.

Research Limitations and Suggestions for Future Studies

Although this study, by adopting a qualitative methodology and theme analysis, provided a local and comprehensive model for mentoring organizations in the petrochemical industry, it is affected by some limitations that will pave the way for future research:

Research Limitations

1. Geographical and organizational limitations: This study focused on petrochemical industries in a specific geographical region; therefore, the generalizability of the results to other industries with different levels of risk or different organizational cultures should be done with caution.
2. Qualitative nature of data: Despite the depth of the thematic analysis, this research is qualitative in nature and, from a methodological perspective, is based on the analysis of the lived experiences of experts. Therefore, the lack of quantitative (longitudinal) data to accurately measure changes in performance indicators in the long term is one of the key limitations.
3. The effect of intervening variables: In high-risk environments, external factors (such as economic fluctuations and macro-industrial policies) can affect managers' commitment to coaching programs, which were not fully controlled for in this study.

Suggestions for future research:

1. Quantitative Validation: It is suggested that future researchers quantitatively test the variables extracted in this study by designing structural models (SEM) and measure the causal relationships between "coaching culture" and "HSE productivity indicators" on a larger scale.
2. Longitudinal Studies: To measure the sustainable effects of this model, it is necessary to conduct longitudinal studies that monitor behavioral changes of employees and managers over time periods of 2 to 5 years.
3. Adapting the coaching model to emerging technologies: Given the speed of digital transformation, future research can focus on integrating "artificial intelligence" and "virtual reality (VR)" into industrial coaching processes and examine how these technologies can be used to simulate high-risk situations for safe learning.
4. Comparative Analysis: A comparative study of this model with common coaching models in military industries or nuclear power plants (which are comparable to petrochemicals in terms of risk level) could add to the theoretical richness of this research.

Declaration of Competing Interest

The author declares that he has no competing financial interests or known personal relationships that would influence the report presented in this article.

References

- Al-Nasser, A. and Behery, M. (2015). Examining the relationship between organizational coaching and workplace counterproductive behaviours in the United Arab Emirates, *International Journal of Organizational Analysis*, Vol. 23 No. 3, pp. 378-403.
- Arefnejad, M., Shariatnejad, A., Hosseini, M., & Saleh Abadi, S. (2024). Tarrahi-ye olgoo-ye peydayesh-e rahbari-ye morabbi-gera dar sazman-ha-ye dowlati ba ravesh-e olgoo-sazi-ye sakhtari-ye tafsiri (Motale'eh-ye sazman-ha-ye dowlati) [Designing an emergence model of coaching leadership in public organizations using interpretive structural modeling (A study of public organizations)]. *Journal of Psychological Research in Management*, 10(1), 117– [in Persian]
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Cannon-Bowers, J. A., Bowers, C. A., Carlson, C. E., Doherty, S. L., Evans, J., & Hall, J. (2023). Workplace coaching: A meta-analysis and recommendations for advancing the science of coaching. *Frontiers in Psychology*, 14, 1204166. <https://doi.org/10.3389/fpsyg.2023.1204166>
- Dadkhah Aghdash, H., Jalali, A., & Asadi, E. (2025). *Ta'vin-e shakhes-ha-ye sazman-e morabbi-gera mobtani bar ahdaf-e siyasat-ha-ye tahavvol-e nezam-e edari: Mored-e motale'eh Sazman-e Hefazat-e Mohit-e Zist* [Determining the indicators of a coach-oriented organization based on the goals of administrative system reform policies: A case study of the Department of Environment] [Conference presentation]. 2nd Conference on Coaching Strategies and Problem Solving, Babolsar, Iran. <https://civilica.com/doc/2527361> [in Persian]
- Fleddermann, K., Jacobson, N., Horst, J., Madden, L. M., Haram, E., & Molfenter, M. (2023). Opening the “black box” of organizational coaching for implementation. *BMC Health Services Research*, 23, Article 106. <https://doi.org/10.1186/s12913-022-08948-6>
- Garrison, D. R. (2016). *E-learning in the 21st century: A community of inquiry framework for research and practice*. Routledge.
- Golparvar, S., Mohammadi Moghaddam, Y., & Abdollahi, B. (2023). Tarrahi-ye olgoo-ye sazman-e morabbi-gera ba rooykard-e parvaresh-e sarmayeh-ye ensani baraye daneshgah-ha ba teknik-e model-sazi-ye sakhtari-ye tafsiri [Designing a coach-oriented organization model with a human capital development approach for universities using interpretive structural modeling (ISM)]. *Journal of Public Administration Perspective*, 14(2), 183–206. <https://doi.org/10.48308/jpap.2023.103572> [in Persian]
- Grant, A. M. (2022). Solution-focused coaching: The basics for advanced practitioners. In D. Tee & J. Passmore (Eds.), *Coaching practiced* (pp. 311–322). Wiley.
- Grant, A. M., & Cavanagh, M. J. (2007). Evidence-based coaching: Flourishing or languishing? *Australian Psychologist*, 42(4), 239–254. <https://doi.org/10.1080/00050060701648175>
- Greif, S., Möller, H., Scholl, W., Passmore, J., & Müller, F. (Eds.). (2022). *International handbook of evidence-based coaching: Theory, research and practice*. Springer Cham. <https://doi.org/10.1007/978-3-030-81938-5>
- https://www.itdl.org/Journal/Jan_05/article01.htm
- Hugill, K., Sullivan, J., & Ezpeleta, M. L. (2018). Team coaching and rounding as a framework to enhance organizational wellbeing, & team performance. *Journal of Neonatal Nursing*, 24(3), 148-153.
- Iroanwusi, F. O., & Ekweozor, U. C. (2025). Coaching and organizational performance of oil and gas companies in Rivers State. *Contemporary Accounting and Management Research Journal*, 9(2), 112–122.
- Ismail, A. B., Nursaadatun Nisak, A., & Zainol, A. (2016). Managerial coaching in enhancing employees' motivation. *Acta Universitatis Danubius. (Economica)*, 12(3).
- Jarosz, J., & Cartor, R. (2025). Coaching effectiveness framework. *International Journal of Evidence Based Coaching and Mentoring*, 23(1), 49–66. <https://doi.org/10.24384/ssyz-ng55>
- Kampa-Kokesch, S., & Anderson, M. Z. (2001). Executive coaching: A comprehensive review of the literature. *Consulting Psychology Journal: Practice and Research*, 53(4), 205–228. <https://doi.org/10.1037/1061-4087.53.4.205>
- Khorasani, A., & Fathi Vajargah, K. (2016). *Morabbi-gari dar amoozesh va behsazi-ye manabe-e ensani* [Coaching in human resource development and training]. Industrial Management Institute / Iran Industrial Training & Research Center Publishing. [in Persian]
- Kirkpatrick, D. L. (1977). Evaluating training programs: Evidence vs. proof. *Training and Development Journal*, 31(11), 9–12.

- MacKie, D. (2014). The effectiveness of strength-based executive coaching in enhancing full range leadership development: A controlled study. *Consulting Psychology Journal: Practice and Research*, 66(2), 118–137. <https://doi.org/10.1037/cpb0000005>
- MahdaviParsa, F., & Nastiezaie, N. (2024). Tadvine olgoo-ye pishayandi–pasayandi-ye sazman-e morabbi-gera dar nezam-e amoozesh va parvaresh-e Iran [Developing an antecedent-consequent model of a coach-oriented organization in the Iranian educational system]. *Journal of Educational Leadership Research*, 8(30). [in Persian]
- Nguyen, G. T., Matošková, J., Pham, N. T., & Nguyen, M. T. (2024). Employee informal coaching and job performance in higher education: The role of perceived organizational support and transformational leadership. *Frontiers in Psychology*, 14, 1204166.
- Nosrati, T., Gholamzadeh, D., & Momeni, M. (2021). Era'e-ye olgoo-ye shayestegi-ye morabbi-gari-ye modiran [Presenting a competency model for managerial coaching]. *Journal of Human Resource Management Research*, 13(2), 103–114. [in Persian]
- Passmore, J., & Sinclair, T. (2020). *Becoming a coach: The essential ICF guide*. Springer.
- Rafati, M., & Samadi, M. (2019). *Barresi-ye tasir-e morabbi-gari-ye sazmāni bar raftar-e enherafi ba tavajjoh be naqsh-e tadjil-gari-ye tavanmandsazi-ye karkonan va farhang-e sazmāni* [Investigating the impact of organizational coaching on deviant behavior considering the moderating role of employee empowerment and organizational culture] [Conference presentation]. 3rd International Conference on Management, Industrial Engineering, Economics and Accounting, Tehran, Iran. [in Persian]
- Saghafi, T., Ghorbani, M., & Naseri, N. S. (2024). *Barresi-ye tasir-e abad-e esteqrar-e sazman-e morabbi-gera bar yadgiri-ye sazmāni dar pardis-ha va marakez-e amoozesh-e aali-ye Daneshgah-e Farhangian* [Investigating the impact of the dimensions of establishing a coach-oriented organization on organizational learning in Farhangian University campuses and higher education centers] [Conference presentation]. Civilica. <https://civilica.com/doc/2499812> [in Persian]
- Siemens, G. (2005). Connectivism: A Learning Theory for the Digital Age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10.
- Williams, J. S., & Lowman, R. L. (2018). The efficacy of executive coaching: An empirical investigation of two approaches using random assignment and a switching-replications design. *Consulting Psychology Journal: Practice and Research*, 70(3), 227–249. <https://doi.org/10.1037/cpb0000115>.