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Entry-Exit Criteria for the Mechanical Engineering AI Talent Granary Model in the Intelligent Digital Age

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Abstract: Addressing the challenges of precision and adaptability in cultivating AI talent for mechanical engineering professionals, this paper utilizes the "AI Talent Granary" model, focusing on its core dynamic mechanism: the "Warehouse Entry and Exit Criteria." The study innovatively applies the team role model from *Journey to the West* to talent classification, constructing vivid portraits of four distinct AI talent archetypes: the Sun Wukong-type, the Zhu Bajie-type, the Sha Wujing-type, and the Tang Monk-type. Based on these profiles, the system establishes a corresponding criteria framework spanning three phases: For the Warehouse Entry phase, a precision selection model based on role potential is proposed; for the In-Warehouse Development phase, a role-empowered PBL-OKR integrated training model is designed; and for the Warehouse Exit phase, role-value-based multi-certification and intelligent matching criteria are established. Ultimately, this research offers a vivid, profound, and effective strategic framework to address the critical challenges of "inaccurate selection, inadequate development, and ineffective utilization" of AI talent in mechanical engineering disciplines.

Keywords: AI Talent Granary; Warehouse Entry and Exit Criteria; Mechanical Engineering Major; Journey to the West Team Model; Character Profile; PBL; OKR

1. Introduction

Reinforced by the 2024 State Council Government Work Report, which explicitly positions artificial intelligence as the core engine for industrial upgrading, the "AI Plus" initiative is gaining significant momentum in the manufacturing sector. This mandate necessitates a profound industrial transformation in mechanical engineering, urgently requiring interdisciplinary talents proficient in both mechanical expertise and AI application capabilities[1]. Geekbang Technology's white paper, entitled "Interpreting the AI Talent Granary Model in the Digital Intelligence Era (2024 Edition)," further details this critical context. The report indicates that the current AI talent gap has reached hundreds of thousands. Crucially, interdisciplinary professionals who possess both AI technical expertise and deep industry knowledge are particularly scarce[2,3].

The "AI Talent Granary" concept provides a crucial framework for systematically cultivating AI professionals in mechanical engineering. However, traditional talent development models exhibit significant shortcomings across three phases: onboarding, in-program, and offboarding. Specifically: Onboarding relies on narrow selection criteria that fail to identify diverse talent potential; in-program development employs imprecise methods incapable of personalized empowerment; and offboarding utilizes rigid evaluation mechanisms that result in inaccurate talent-to-role matching. These issues severely constrain the operational effectiveness of talent development systems[4,5].

To address these challenges, this study pioneers the application of the team role model of the Tang Monk and his disciples from *Journey to the West* into the field of AI talent cultivation. It constructs a vivid and highly practical system of entry and exit criteria. This system delivers an innovative solution for the efficient operation of talent pipelines through precise role profiling, differentiated development pathways, and intelligent matching mechanisms.

2. The Journey to the West Team Role Model as a Theoretical Foundation for Constructing the AI Talent Granary

The team of Tang Monk and his disciples in Journey to the West represents a classic team model characterized by well-balanced structure and complementary strengths. In traditional team building and talent development, tailored approaches are typically implemented based on two dimensions: talent loyalty to the enterprise and work capability[6], as illustrated in Figure 1.

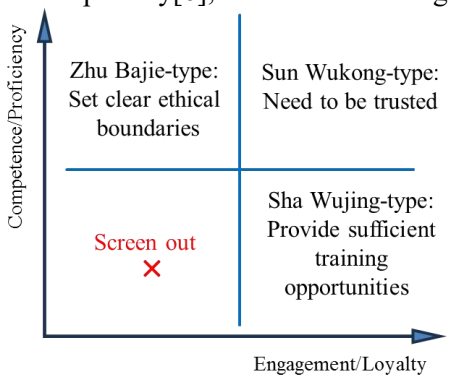

Figure 1. Talent Development Program Based on Characters from Journey to the West

The model delineates four distinct talent profiles based on the intersection of capability and loyalty dimensions. Occupying the first quadrant is the Sun Wukong-type (Q1), representing the ideal synthesis of strong capabilities and exceptionally high loyalty to the mission; such talent warrants full empowerment and substantial responsibility. In contrast, the Zhu Bajie-type (Q2) is characterized by robust capability but limited loyalty, necessitating that management establish clear value boundaries to constrain behavioral risks. Shifting focus to developmental potential, the Sha Wujing-type (Q4) demonstrates high loyalty despite average capability, implying that the strategy should prioritize sufficient training opportunities to elevate their professional competence. Finally, individuals lacking both critical attributes fall into the third quadrant (Q3); to preserve team vitality, this group must be systematically eliminated from the structure.

By projecting this archetypal framework onto the AI Talent Granary for mechanical engineering, and specifically integrating the Tang Monk-type leader—characterized by unwavering goal orientation, team unification, and strategic vision—the model synthesizes four distinct talent role profiles, as systematically outlined in Table 1.

Table 1. AI Talent Profile for Mechanical Engineering: The Four-Type Journey to the West Characters

Character Type	Core Traits	Talent Orientation	Representative Positions	Core Competency Requirements
Sun Wukong-type	Masterful technical skills, tackling tough challenges, driven by curiosity and disruptive thinking	AI Technology Core / System Architect	Algorithm Engineer, System Architect	Deep learning, algorithm innovation, system design
Zhu Bajie-type	Highly approachable, excellent communicator, proficient in tools, business-scenario savvy	AI Application Specialist / Product Manager	AI Product Manager, Solutions Engineer	Requirement Analysis, Tool Utilization, Cross-Departmental Collaboration
Sha Wujing-type	Loyal and dependable, strong in execution, a faithful follower of procedures	AI Application Engineer / Operations and Maintenance	Data Engineer, Model Operations Engineer	Data processing, model deployment, system maintenance
Tang Monk-type	Goal-oriented, adept at uniting others, and adept at steering strategic direction	AI Project Leader / Strategic Manager	Technical Director, Head of AI Lab	Strategic Planning, Resource Integration, Team Building

The value of this role model lies in its ability to transcend the abstract limitations of traditional talent classification. By presenting vivid character archetypes, it renders complex talent attributes intuitive and perceptible. Each role type corresponds to a clear talent positioning and competency requirements, providing a solid theoretical foundation for subsequent development of entry and exit criteria.

The four archetypes form a complete ecosystem within the team: Sun Wukong-type talents drive technological breakthroughs, Zhu Bajie-type talents implement technical solutions, Sha Wujing-type talents ensure stable operations, and

Tang Monk-type talents steer the direction of development. This ecosystem-based role configuration guarantees structural balance and functional completeness within the talent granary.

3. Establishing the "Role Potential-Based Precision Selection Model" for Warehouse Admission Criteria

The talent entrance phase serves as the foundational stage for quality control, with its core mission being the establishment of a diversified selection mechanism aligned with the four distinct role types. Traditional single-score evaluation models prove inadequate for identifying diverse role potentials, necessitating the development of a multidimensional, differentiated criteria system for talent intake.

3.1 Diverse Selection Pathway Design

Based on the distinct characteristics of the four role types, establish targeted selection pathways:

(1) Sun Wukong-Type Technical Talent Pathway: Concentrates on evaluating algorithm design capabilities, mathematical foundations, and innovative thinking. Through practical programming exercises and algorithmic competitions, we evaluate candidates' technical depth and problem-solving abilities.

(2) Zhu Bajie-type Holistic Wellness Pathway: Emphasizes communication and coordination skills, requirements analysis, and tool proficiency. Through group discussions, case studies, and product design exercises, assess their business comprehension and teamwork capabilities.

(3) Sha Wujing-type Skills-Based Practical Pathway: Prioritizes responsibility, attention to detail, and process execution. Evaluate their professional competence and work ethic through practical assessments and project tracking.

(4) Tang Monk-type Leadership Potential Pipeline: Focuses on strategic thinking, resource integration, and team influence. Identify leadership potential through activities such as leaderless group discussions and strategic planning presentations.

3.2 Development of Intelligent Screening Tools

Leveraging modern technological tools, the study develops corresponding selection instruments to establish competency assessment and development pathways tailored to each specific talent profile. Specifically, this involves: designing technical creativity evaluations for expertise-driven students (Sun Wukong-type); creating business communication assessments for those with comprehensive aptitude (Zhu Bajie-type); establishing occupational stability metrics for students focused on practical skills (Sha Wujing-type); and finally, formulating strategic leadership frameworks for candidates exhibiting high management potential (Tang Monk-type).

As illustrated in Figure 2, this selection mechanism ensures that diverse individuals are channeled into the growth pathways best suited to their developmental potential, thereby laying the groundwork for subsequent targeted cultivation and ultimately guaranteeing the precise placement of candidates into the talent granary.

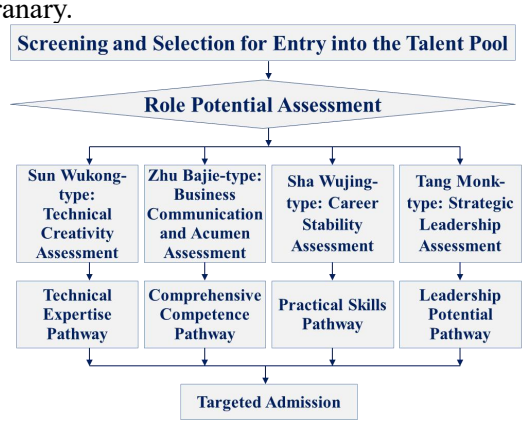

Figure 2. Role-Based Mechanical AI Talent Selection Process

3.3 Integration of Ideological and Political Education into the Course Design Phase

During the selection process, emphasis is placed on evaluating candidates' values and development motivations:

(1) Design scenario-based questions on serving the nation through science and technology to assess candidates' sense of national pride and commitment to their homeland.

(2) Through case studies in engineering ethics, examine their professional integrity and sense of social responsibility.

(3) Observe their integrity and teamwork spirit during collaborative tasks.

4. Developing In-Granary Criteria for a Role-Based Empowerment PBL–OKR Integrated Training Model

The onboarding phase is a critical period for shaping talent capabilities, requiring tailored

development plans based on the distinct characteristics of the four role types. The integrated application of PBL and OKR provides an effective pathway for personalized empowerment.

4.1 Differentiated Pathway Design

Building upon the distinct competency profiles and developmental necessities of each role, the framework constructs targeted cultivation paradigms. As systematically delineated in Table 2, these paradigms are operationalized through distinct project categories, which serve to strategically align specific OKR priorities with precise integration points for course-based ideological and political education.

Table 2. Differentiated Development Plan for Four Role Types

Role Type	Cultivation Model	Project Type	Key Considerations for OKR Setup	Integration Points for Ideological and Political Education in Courses
Sun Wukong-type	objective-based authorization system	Technological Innovation Metrics and Patent Output for Cutting-Edge Technology Breakthrough Projects	Technological Innovation Metrics and Patent Output for Cutting-Edge Technology Breakthrough Projects	Mission to Serve the Nation Through Science and Technology, Academic Integrity
Zhu Bajie-type	Project Cooperation System	Productization Implementation Project	User satisfaction, product metrics	Customer-centric, integrity-driven
Sha Wujing-type	Skill Certification System	Process Optimization Project	Quality Standards, Efficiency Enhancement	Craftsmanship, quality consciousness
Tang Monk-type	Ecosystem Development Framework	Strategic Planning Project	Team Development and Influence Building	Social Responsibility, Sustainable Development

4.2 PBL Project Repository Development

PBL (Project-Based Learning) As a teaching methodology centered on authentic, complex problems[7], this study constructs a four-tier industrial project repository—"foundational skills, integrated application, innovative research, and strategic planning"—tailored to the developmental needs of four role types. This enables students to construct knowledge and enhance capabilities through practical engagement.

(1) Fundamental Skills Program: For Sha Wujing-type talents, cultivate standardized engineering practice capabilities.

(2) Integrated Application Project: For Zhu Bajie-type talents, develop cross-disciplinary knowledge integration skills.

(3) Innovative Research Projects: For Sun Wukong-type, foster the capacity to explore cutting-edge technologies.

(4) Strategic Planning Project: For Tang Monk-type, develop strategic thinking capabilities within the system.

Each program establishes clear learning objectives and competency requirements, integrated with the credit bank system to achieve standardized certification and accumulation of learning outcomes.

4.3 OKR Process Governance Framework

OKR (Objectives and Key Results) as a management approach for defining clear objectives and tracking their completion, is applied in this study to process management for talent at all levels[8]. By introducing the OKR methodology—a modern corporate management technique—into the development process, a continuous improvement cycle is established:

(1) Aim Setting: Set personalized development goals based on role positioning.

(2) Key Results: Quantify measurement standards to ensure the feasibility of objectives.

(3) Regular Review: Adjust development paths in a timely manner through periodic evaluations and feedback.

(4) Dynamic Optimization: Continuously refine objectives and key results based on implementation progress.

5. Warehouse Release Criteria: Role-Based Multi-Criteria Certification and Intelligent Matching

The deployment phase represents the culmination of talent development value, necessitating the establishment of a diversified

certification system and intelligent matching mechanism aligned with the four role types.

5.1 Multi-Dimensional Certification Standards System

Break away from the traditional evaluation model that prioritizes academic credentials alone[9] and establish a diverse certification system based on role value, as shown in Figure 3.

Figure 3. AI Talent Ability Certification Matrix

This certification system fully reflects the value characteristics of different role types, ensuring the comprehensiveness and impartiality of the evaluation. Sha Wujing-type Skill Certificate: Demonstrates its strengths in standardized skill certification and consistent execution, positioned in the dimensions of foundational skills and individual contribution. Sun Wukong-type Technical Patent: Embodies the qualities of a technology leader, possessing both high innovative value and strong team leadership capabilities. Zhu Bajie-type Project Outcomes: Demonstrates outstanding performance in the innovation value dimension while possessing strong individual contribution capabilities. Tang Monk-type Team Building: Demonstrates excellence in team leadership while possessing solid foundational skills.

5.2 Intelligent Matching and Release Mechanism

Establish a smart matching system based on digital profiling:

(1) Digital Talent Profile: Integrate all data collected during the warehousing period to form a comprehensive capability profile.

(2) Position Requirements Model: Analyze the competency requirements for corporate positions and establish standardized requirement templates.。

(3) Intelligent Matching Algorithms: Leveraging machine learning technology to achieve precise matching between talent and job openings.

(4) Multi-output channels: Provide diverse development pathways including employment, entrepreneurship, and advanced studies.

5.3 Inspection of Ideological and Political Education during Course Delivery

During the graduation phase, a value-based competency assessment[10] will be conducted, focusing on evaluating: understanding and implementation of the manufacturing powerhouse strategy; awareness of engineering ethics and commitment to social responsibility; professional integrity and teamwork spirit; innovation mindset and development potential.

6. Implementation Support and Continuous Optimization

To ensure the effective implementation of warehouse access and exit protocols, it is necessary to establish a robust safeguarding mechanism and a continuous optimization system.

(1) Organizational Support System: Establish a Standards Implementation Committee for School-Enterprise Collaboration; Form a specialized evaluation and certification team; Set up a dedicated quality monitoring department.

(2) Data Support Platform: Establish a unified data management platform to enable comprehensive data collection and analysis throughout the entire process. This includes: Inbound Screening Data Management System., In-Process Cultivation Monitoring System, Outbound Evaluation and Matching Support System Graduate Development Tracking System.

(3) Continuous Optimization Regime: Establish a data-driven continuous improvement mechanism. Regularly evaluate the effectiveness of guideline implementation, promptly collect feedback from all parties, dynamically adjust guideline content and standards, and continuously refine workflows and methodologies.

7. Conclusion and Future Work

The entry-exit criteria system developed in this study, based on the team role model from Journey to the West, possesses the following innovative features and practical value:

In terms of theoretical innovation, this approach integrates the collective wisdom found in classical literature with modern talent development theories to create a vivid and illustrative talent profiling model. This model offers new perspectives and methodologies for talent identification and classification.

In practical application, the proposed precision selection model, differentiated training programs, and intelligent matching mechanism provide actionable implementation guidelines for universities and enterprises, helping to enhance the precision and effectiveness of talent development.

At the methodological level, the integrated application of PBL and OKR provides an effective pathway for personalized talent development; the diversified certification system and intelligent matching mechanism provide innovative models for talent evaluation and output.

Driven by the rapid advancement of artificial intelligence and the continuous evolution of industrial demands, the core warehouse protocols will require ongoing optimization and refinement. Through persistent practical exploration and theoretical innovation, this comprehensive system is poised to provide robust support for cultivating AI talent in mechanical engineering, thereby strengthening national capacity and accelerating the development of a manufacturing powerhouse.

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