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Cultivating the Craftsmanship Spirit among Vocational College Students in the New Era: A Five-Dimensional Pathway

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Abstract: The high-quality development of vocational education in China has made the cultivation of the craftsmanship spirit a central educational objective rather than a peripheral slogan. Yet many vocational colleges still struggle to translate this objective into coherent teaching practice, particularly in curriculum design, practical training assessment, campus culture, and school–enterprise collaboration. This conceptual study develops a five-dimensional pathway that integrates curriculum teaching, practical training and practice, campus culture, school–enterprise collaboration, and teaching staff development. Drawing on literature, policy analysis, and illustrative examples, it first clarifies the craftsmanship spirit as a composite of affective commitment, cognitive understanding of standards, and behavioral dispositions toward precision, concentration, responsibility, and improvement. It then proposes a pathway in which curriculum teaching provides the cognitive foundation, practical training supplies the behavioral training ground, campus culture creates emotional immersion, school–enterprise collaboration offers authentic situations, and teachers act as the key guarantee. A cross-dimensional collaborative mechanism-shared goals, co-constructed curricula, shared faculty, joint assessment, and shared resources-is proposed to prevent fragmented implementation. The paper also specifies illustrative process and outcome indicators, making the pathway available for pilot testing and contextual adaptation. Its contribution is to offer a theoretically grounded, implementable, and evaluable framework for integrating craftsmanship education into vocational colleges; empirical validation through action research remains the next step.

Keywords: Craftsmanship Spirit, Vocational Education, Curriculum-embedded Values Education, School–enterprise Collaboration, Teaching Staff Development.

1. Introduction

China's industrial upgrading has brought renewed attention to workforce quality. The National Vocational Education Reform Implementation Plan (2019) positioned vocational education as a distinct type of education of equal importance to general education and called for closer school–enterprise integration [1]. In this context, the craftsmanship spirit (gongjiang jingshen) has become a central goal of talent cultivation rather than an optional "add-on" [2].

Policy advocacy, however, has not been matched by systematic practice. Many vocational colleges include the craftsmanship spirit in their cultivation plans, but it often remains a slogan rather than a principle organizing curriculum, assessment, and workplace learning [3]. Implementation tends to be fragmented-a lecture series, a skills competition, or a single module on professional ethics-and such activities rarely produce sustained changes in disposition and behavior [4].

Students' orientations complicate the task. Vocational college students enter a labor market marked by flexible employment and rapidly changing demands, and some prioritize immediate income or credentials over long-term craft development [5]. This is less a generational deficit than a design challenge: if craftsmanship is presented only as a moral ideal, it cannot compete with the concrete pressures and incentives that shape students' choices. Cultivation must therefore connect professional values with career interests, identities, and recognition [6].

Research on craftsmanship education has examined curriculum integration [2, 6], modern apprenticeship and school–enterprise collaboration [4, 7], and dual-qualified teachers [8]. What remains less developed is an integrated account of how these dimensions interact. Much of the literature offers normative prescriptions or describes individual interventions; it rarely specifies the mechanisms through which curriculum, practice, culture, enterprise involvement, and teacher development reinforce one another. This gap matters because fragmentation is not merely an implementation detail but a structural condition that absorbs craftsmanship education into existing routines. This paper therefore asks two questions: what are the constituent dimensions of a coherent pathway, and what function does each serve? How can these dimensions be coordinated and evaluated so that the pathway is implementable and adaptable? It develops a five-dimensional framework-curriculum teaching, practical training, campus culture, school–enterprise collaboration, and teaching staff-as a conceptually grounded and operationally specified contribution rather than an empirical evaluation.

2. Conceptual and Theoretical Foundations

2.1. The Craftsmanship Spirit as a Composite Disposition

The Chinese term gongjiang jingshen is often translated as "craftsmanship spirit" or "artisan spirit." In policy discourse it refers to a cluster of virtues associated with skilled work-dedication, precision, concentration, responsibility, innovation, and integrity-but such lists can become slogans. A more analytical definition is therefore needed.

This paper treats the craftsmanship spirit as a composite disposition with three interrelated components. The affective component concerns attachment to, and identification with, one's work: a sense of pride, care, and commitment that makes quality a personal concern rather than an external requirement. The cognitive component concerns understanding: knowledge of materials, processes, standards, and the reasons behind them, including the ability to judge when a deviation matters. The behavioral component concerns conduct: the habits of preparation, precision, persistence, safety, and reflective improvement that are displayed in actual work. These components are not separate traits. A worker who cares about quality but lacks the knowledge to recognize defects cannot act on that care; a worker who knows the standards but lacks the disposition to follow them will cut corners under pressure.

This definition has two implications for education. First, craftsmanship cannot be taught as a body of knowledge alone. It requires opportunities to act, receive feedback, and experience the consequences of one's work. Second, it cannot be reduced to compliance. The capacity to improve, question, and adapt is part of craftsmanship, not an alternative to it. Education should therefore cultivate both the disposition to meet standards and the judgment to know when standards need to be revised. This distinguishes craftsmanship from narrow perfectionism and connects it to innovation and professional responsibility.

2.2. Theoretical Perspectives

Four perspectives inform the framework.

Vocational education as a distinct type of education. Vocational education is not a lower-tier version of academic education but a different type of education with its own epistemology, pedagogy, and relationship to work [9]. Its distinctive strength lies in its proximity to occupational practice. This perspective implies that craftsmanship education must be embedded in authentic vocational contexts-workshops, laboratories, and enterprises-rather than delivered only through classroom instruction.

Curriculum-embedded values education. In the Chinese context, curriculum-based ideological and political education (kecheng sizheng) refers to the integration of value formation into disciplinary and professional teaching, rather than the addition of separate moral education courses [2]. Its pedagogical logic is that values are learned through the ways in which knowledge is selected, framed, and applied. For craftsmanship education, this means that professional courses should not merely mention craftsmanship as a topic; they should model standards of evidence, precision, and responsibility in the way content is taught and assessed [6]. The approach also cautions against indoctrination: value formation is more durable when students encounter dilemmas, make judgments, and reflect on the consequences of their choices.

Situated learning and embodied cognition. Situated learning holds that knowledge and skill are developed through participation in communities of practice, in relation to authentic tasks, tools, and norms [10, 11]. Embodied cognition adds that dispositions are shaped through repeated engagement with materials and processes, not merely through verbal instruction. This perspective explains why workplace learning can be powerful: apprentices encounter real constraints, observe experienced practitioners, and gradually take on more responsibility. The German dual system is a well-known example of institutionalizing this logic, although its transferability depends on governance, employer commitment, and the quality of workplace mentoring [12]. Simulated and real tasks should therefore approximate the complexity, uncertainty, and social accountability of work.

Collaborative governance. Craftsmanship education involves multiple actors-schools, enterprises, governments, industry associations, and families-with different resources, interests, and time horizons [13]. Collaborative governance emphasizes shared goals, mutual trust, and institutional arrangements that make cooperation sustainable. In vocational education, school–enterprise collaboration cannot rely solely on personal relationships or short-term contracts. It requires formal mechanisms for co-designing curricula, sharing faculty, assessing students, and resolving conflicts [7]. The perspective also shifts evaluation from a single-school judgment to a multi-actor process in which employers, mentors, teachers, and students contribute evidence.

2.3. Analytical Framework and Design Criteria

The five dimensions of the pathway correspond to these theoretical perspectives. They were derived by mapping the implementation sites recurrent in the literature-curriculum, practical training, campus culture, enterprise placements, and teacher development-onto the theoretical functions identified above. Curriculum teaching addresses the cognitive component; practical training addresses the behavioral component; campus culture addresses the affective component; school–enterprise collaboration provides authentic situations; and teaching staff development supplies the human capacity to sustain the other four. These dimensions are not a checklist of independent activities. They form an ecology in which the effects of one dimension depend on the others. A well-designed curriculum will have limited impact if practical training rewards speed over quality; a strong campus culture will ring hollow if internship assessments ignore craftsmanship; and enterprise mentors cannot compensate for teachers who lack the confidence to integrate professional values into their subjects.

The framework is guided by four design criteria. Fit refers to alignment with the institutional context, including the specialty structure, student profile, and available resources of vocational colleges. Implementability refers to clarity about who does what, with which resources, and under what conditions. Evaluability refers to the availability of observable evidence and feasible procedures for judging whether the pathway is working. Scalability refers to the capacity to adapt the pathway across specialties and institutions without losing its core logic. These criteria structure the design and evaluation that follow.

2.4. Research Approach

This paper is positioned as the framework-building phase of a larger project. It draws on a selective review of Chinese and international literature on craftsmanship education, vocational education, situated learning, and collaborative governance; an analysis of national policy documents; and illustrative examples of vocational college and enterprise practices. The literature was selected for relevance to the conceptual dimensions of the framework, and the examples were used to generate and illustrate design principles rather than to test causal claims. The synthesis followed a thematic logic: identifying recurring problems, mapping theoretical

perspectives onto educational functions, and translating them into operational components. Because the paper does not report empirical outcome data, the framework is offered as a theoretically grounded design proposal rather than evidence of effectiveness; it is intended to be tested through action research in partner colleges.

3. A Five-Dimensional Cultivation Pathway

The pathway is organized around five dimensions that together address the affective, cognitive, behavioral, situational, and human resource conditions of craftsmanship education. The dimensions are presented separately for analytical clarity, but they are intended to operate as an integrated system. Table 1 summarizes their functions, core actions, and illustrative indicators.

3.1. Curriculum Teaching: Building the Cognitive Foundation

Curriculum teaching is the most systematic entry point, but it is also where craftsmanship education often becomes superficial. Adding a lesson on "craftsmanship" to a crowded syllabus may satisfy an administrative requirement without changing students' understanding. A more defensible approach is to identify the craftsmanship elements intrinsic to each course and make them visible in objectives, content, and assessment.

3.1.1. Aligning Course Objectives with Intrinsic Craftsmanship Elements

Each course should identify two or three craftsmanship elements that arise naturally from its subject matter and write them into course standards and learning outcomes in observable terms. Instead of asking students to "develop craftsmanship spirit," a course might require them to "apply tolerances consistently, document deviations, and explain the consequences of non-compliance." This specificity gives teachers and students a shared referent and makes assessment possible [14]. Curriculum mapping can prevent both omission and saturation: every course should carry a few elements deeply rather than all elements superficially.

3.1.2. Building a Case Library

A case library can connect abstract values to concrete decisions. Cases should include national craftsmen, model workers, local technicians, alumni, and ordinary practitioners whose work demonstrates care and competence [15]. Near-peer and local examples matter because distant heroes can seem exceptional and irrelevant. Cases should be designed for analysis rather than admiration. A useful case presents a dilemma-a technician discovers a defect close to delivery, or a team must choose between speed and quality-and asks students to identify the standards involved, evaluate the options, and justify a course of action.

3.1.3. Designing Pedagogy and Assessment for Reflection

Craftsmanship is learned through reflection on practice, not through the transmission of doctrine. Teachers can use structured questioning, comparison of exemplary and flawed work, and reflective writing to help students articulate what quality requires. Assessment should require students to explain decisions, diagnose errors, and propose improvements. Curriculum-embedded values education is most effective when it is congruent with disciplinary standards: in nursing, responsibility can be grounded in infection control; in engineering, it can be grounded in tolerance analysis and failure investigation. This congruence helps students see craftsmanship as part of professional competence [2, 6].

3.2. Practical Training and Practice: The Behavioral Training Ground

Practical training is where craftsmanship becomes visible, and where assessment can either reinforce or undermine the curriculum. If students are graded only on whether a product functions or a procedure is completed, they learn that speed and output matter more than process and care. A craftsmanship-oriented system must make process quality observable and consequential.

3.2.1. Process-Oriented Assessment

Rubrics should include preparation, adherence to operating standards, safety, precision, responsibility, teamwork, and improvement, with each dimension described in behavioral terms. For example, "precision" might range from "frequently exceeds tolerances and does not check results" to "consistently meets tolerances and independently verifies critical dimensions." Process evidence can include observation records, work logs, photographs, and reflective notes. The weighting of process and product should reflect the learning goals of the task, and self- and peer assessment should be moderated to remain credible.

3.2.2. Project-Based Tasks and Skills Competitions

Project-based tasks can approximate the complexity of real work. Students should encounter constraints, incomplete information, and trade-offs, and should revise their work in response to feedback. Indicators such as design iterations, dimensional accuracy, defect rates, and on-time completion can translate dispositions into observable evidence. These indicators should be used diagnostically, not as a ranking system. Skills competitions can motivate students but may narrow participation; they should be complemented by classroom-level challenges and should assess safety, work organization, and reflection as well as speed and technical difficulty [16].

3.2.3. 6S and the Routines of Work

6S-sort, set in order, shine, standardize, sustain, and safety-provides a routine for cultivating order, discipline, and safety awareness. It makes visible the infrastructure of quality: tools in the right place, materials properly stored, hazards identified, and procedures followed. 6S should be a learning routine rather than a cleaning campaign: students should understand why each practice matters, participate in setting standards, and review deviations, while teachers model the same discipline. The goal is internalization, not obedience.

3.2.4. Practical Training Growth Portfolios

A growth portfolio can document students' development through operation records, quality results, photographs, reflection notes, teacher feedback, and evidence of improvement. It makes progress visible, provides assessment evidence, and communicates capabilities to employers. To avoid becoming a bureaucratic burden, it should be integrated into existing routines and reviewed at key points. Students should know what is recorded, who can access it, and how it will be used.

3.3. Campus Culture: Emotional Immersion

Campus culture shapes what students perceive as normal and worth pursuing. A craftsmanship-oriented culture does

not require spectacles; it requires consistent signals that quality, care, and competence are valued through narrative, participation, and the material environment.

3.3.1. Narrative and Role Models

Lectures by master craftsmen, model workers, and outstanding alumni can broaden students' understanding of skilled work. The format matters: stories that reveal uncertainty, failure, and recovery are more instructive than stories of untroubled success. Speakers should discuss the decisions and compromises behind their achievements, and students should have opportunities to ask questions. Role models should include local technicians, recent graduates, and practitioners across specialties, so that craftsmanship appears as a realistic aspiration rather than an exceptional calling [15].

3.3.2. Student-Led Communities and Cultural Products

Clubs and activity brands can turn students from passive recipients into active producers of craftsmanship culture. A study society might organize site visits; an innovation club might develop projects; a storytelling team might collect oral histories; a video team might produce short documentaries. The key is involvement in inquiry, creation, and public presentation, not mere attendance. Cultural products-exhibitions, podcasts, and digital stories-can provide authentic audiences and strengthen students' sense of purpose. Institutions should provide modest funding, space, and mentoring while allowing creative ownership.

3.3.3. The Material and Symbolic Environment

Bulletin boards, cultural corridors, workshops, and exhibition halls can make craftsmanship visible in everyday campus life. Displays should be connected to learning tasks and current student work, not treated as permanent decoration. An annotated display of student projects can be more educative than a wall of generic slogans. The symbolic environment also includes language: how teachers talk about skilled work, how administrators recognize good teaching, and how the college celebrates achievement all send messages about what is valued. Consistency matters; a campus that celebrates speed while preaching craftsmanship produces cynicism.

3.4. School–Enterprise Collaboration: Authentic Situations

Workplace learning is indispensable because it exposes students to real consequences, customers, and standards. Yet internships do not automatically cultivate craftsmanship. Without intentional design, they can become low-skill repetitive work or a test of endurance. Their educational value depends on the quality of mentoring, the nature of tasks, and the assessment regime.

3.4.1. Enterprise Mentors as Co-Educators

Enterprise mentors should be selected for technical competence and for their ability to explain, demonstrate, and give feedback. They need preparation, reasonable time, and recognition; mentors who supervise students on top of a full workload, without training or incentives, are unlikely to provide deliberate modeling [4]. Mentoring should make professional conduct visible: mentors can narrate decisions, show how they check work, explain why standards exist, and discuss what happens when standards are breached. Students should also observe experienced workers in complex situations, not only perform repetitive tasks.

3.4.2. Internship Assessment

Internship assessment should include attendance and output, but not stop there. Professional attitude, standardized operation, quality awareness, safety, teamwork, and improvement should be assessed through multiple sources: enterprise mentors, school supervisors, student self-assessment, and, where appropriate, customer or peer feedback. Criteria should be shared before the internship begins [4] and adapted to the workplace: in a hospital, “quality awareness” might include infection control and patient communication; in manufacturing, it might include tolerance compliance and defect reporting. The point is to ensure that craftsmanship-related behaviors are noticed and discussed.

3.4.3. Enterprise-Commissioned Classes and Modern Apprenticeship

Enterprise-commissioned classes (dingdan ban) and modern apprenticeship can deepen collaboration by involving employers in curriculum design, instruction, and assessment. When typical work tasks become learning tasks, students encounter the knowledge and skills employers actually use, and enterprises gain a stake in graduate quality; integration of courses and certificates can align outcomes with industry standards [4, 7]. These arrangements require governance. Contracts should specify responsibilities, student rights, mentoring quality, and dispute resolution. Collaboration should not depend on one manager or short-term funding; industry associations and governments can help institutionalize cooperation through standards, platforms, and incentives [7].

3.5. Teaching Staff: The Key Guarantee

Teachers are the hinge between policy and practice. Even a well-designed pathway will fail if teachers lack the confidence, knowledge, and support to enact it. Teacher development has three dimensions: capability, composition, and conduct.

3.5.1. Developing Dual-Qualified Teachers

“ Dual-qualified” teachers combine pedagogical competence with recent industry experience. Enterprise practice can help teachers understand current technologies, quality standards, and workplace cultures, but it should be more than a box-ticking exercise. Teachers need opportunities to work on real projects, observe skilled practitioners, and bring insights back into teaching; institutions should recognize this work in workload calculations, promotion criteria, and professional development plans [8, 17]. Shared faculty arrangements, in which teachers and enterprise engineers co-teach or co-supervise, can expose students to multiple perspectives but require clear roles and quality assurance.

3.5.2. Building Capacity for Curriculum Integration

Many teachers support craftsmanship education in principle but are unsure how to integrate it into their subjects. Training should focus on concrete practices: identifying craftsmanship elements, designing cases and dilemmas, writing behavioral rubrics, and facilitating reflection. Collective lesson preparation, demonstration classes, and teaching competitions can help teachers develop and share these practices [2]. Professional development should also address the risk of moralizing: teachers need to raise value questions without imposing conclusions and connect values to disciplinary evidence.

3.5.3. Part-Time Mentors and the Example of Conduct

Master craftsmen, model workers, and enterprise technicians can serve as part-time mentors, bringing expertise that full-time faculty may lack. Master craftsmen studios and model worker innovation studios can provide spaces for project-based learning, mentoring, and public engagement; roles should be defined clearly, with expectations for supervision and quality assurance [8]. Teachers' own conduct is perhaps the most direct form of craftsmanship education. Rigorous preparation, careful use of equipment, respect for safety, and willingness to revise one's work all communicate standards. Students notice inconsistencies, so leaders should attend to workloads, equipment, and recognition.

3.6. Cross-Dimensional Collaborative Mechanism

The five dimensions are mutually dependent, but interdependence does not happen automatically. Without a collaborative mechanism, each dimension can become a separate project with its own goals, budgets, and evaluation criteria, producing duplication, gaps, and a fragmented student experience. A cross-dimensional mechanism should include shared goals, co-constructed curricula, shared faculty, joint assessment, and shared resources. The college should translate craftsmanship education into measurable objectives endorsed across departments; teachers, enterprise mentors, and industry representatives should collaborate on course standards, cases, and assessment; dual-qualified teachers and enterprise mentors should be deployed across settings; schools, enterprises, and students should contribute assessment evidence; and equipment, facilities, data, and case libraries should be pooled [7, 13]. A cross-departmental working group should meet regularly, review evidence, and allocate resources. Leadership commitment is essential but not sufficient: the mechanism also needs incentives and a data infrastructure that makes progress visible.

Table 1. The five-dimensional cultivation pathway: functions, actions, and illustrative indicators

Dimension	Educational function	Core actions	Illustrative indicators
Curriculum teaching	Cognitive foundation: understanding standards, dilemmas, and professional values	Align course objectives; build a case library; use reflective pedagogy and assessment	Curriculum maps; case quality; analysis and reflection scores
Practical training and practice	Behavioral formation: habits of precision, safety, and responsibility	Process-oriented rubrics; project tasks; 6S routines; growth portfolios	Rubric scores; tolerance and defect data; portfolio evidence; 6S audits
Campus culture	Affective immersion: identification, pride, and perceived norms	Role-model narratives; student-led communities; material and symbolic environment	Participation; student-produced artifacts; climate survey
School–enterprise collaboration	Authentic situations: real consequences, customers, and standards	Mentor training; multi-source internship assessment; order classes and modern apprenticeship	Mentor logs; internship ratings; employer satisfaction; completion rates
Teaching staff	Human resource guarantee: capability, composition, and conduct	Enterprise practice; curriculum integration training; part-time mentors; role modeling	Dual-qualified proportion; enterprise practice hours; teaching artifacts; student evaluations

Note: Indicators are illustrative and should be adapted and validated in local contexts.

4. Implementation and Evaluation

4.1. Design Principles and Phased Implementation

The pathway is a design framework, not a fixed blueprint. Implementation should be phased. In the first phase, a college might select one or two specialties and map existing courses, training routines, and enterprise partnerships against the five dimensions. This diagnostic phase should identify strengths to build on and gaps to address, rather than assuming that everything must be created from scratch. In the second phase, the college can pilot specific changes—for example, a process-oriented rubric in a core practical course, a case library in a professional course, and a mentor training program with one enterprise partner. In the third phase, it can evaluate the pilot, revise the design, and scale it to other specialties. Phasing reduces risk and creates opportunities for formative evaluation, so that problems can be corrected before they become entrenched.

4.2. Evaluation Framework

Evaluation should be proportionate to the purpose. For a pilot, the goal is to understand how the pathway works, not to prove causality with a large sample. A mixed-methods design can combine rubric scores, portfolio analysis, student and teacher interviews, classroom observations, and employer feedback. Where feasible, pre- and post-pilot measures can provide a sense of change, but they should be interpreted cautiously in the absence of a comparison group.

Evaluation can be organized at four levels. The first is engagement: are students and teachers participating, and how do they experience the pathway? The second is learning: do students understand craftsmanship-related standards and dilemmas, and do they report stronger professional identification? The third is behavior: do they demonstrate precision, safety, responsibility, and improvement in practical tasks and internships? The fourth is results: are there changes in work quality, employer satisfaction, retention, or progression? Not all of these can be attributed to the pathway, and evaluation should avoid overclaiming.

Several methodological issues deserve attention. Self-report measures of values are susceptible to social desirability bias. Rubric scores may vary across assessors and should be moderated. Portfolio evidence can be selective. Employer ratings may reflect labor shortages rather than student quality. Triangulation across methods and sources can mitigate these risks, and evaluation should be longitudinal enough to capture changes in disposition, which may take longer than a single semester. Ethical evaluation requires informed consent, anonymity, and attention to power relationships. Students should not feel that their grades depend on positive

evaluations of the program; enterprise data should be anonymized, and personal information should be protected.

5. Discussion

5.1. Theoretical Implications

The framework contributes to the literature in three ways. First, it offers a composite definition of the craftsmanship spirit that integrates affective, cognitive, and behavioral components. This definition avoids the tendency to treat craftsmanship as either a set of virtues or a set of skills, and it provides a basis for designing learning experiences that address all three components. Second, it connects vocational education theory, curriculum-embedded values education, situated learning, and collaborative governance in a single analytical framework. These perspectives are often used separately; bringing them together clarifies why craftsmanship education requires both classroom and workplace learning, and why neither is sufficient on its own. Third, it specifies a cross-dimensional mechanism that addresses fragmentation. The mechanism is not merely a coordination device; it changes the incentives and information flows that shape how teachers and enterprise mentors act.

The framework also qualifies some common assumptions. It suggests that more activities do not necessarily produce more craftsmanship. What matters is whether activities are coherent, whether they provide opportunities for practice and reflection, and whether assessment signals the value of process quality. It also suggests that enterprise involvement is not a panacea. Internships can undermine craftsmanship if they expose students to poor working conditions, low-skill tasks, or mentors who model speed over quality. The quality of workplace learning, not its mere presence, is what matters.

5.2. Practical Implications

For college leaders, the framework implies that craftsmanship education should be embedded in strategic planning, resource allocation, and quality assurance, rather than delegated to a single office or campaign. It requires a cross-departmental structure, a realistic timeline, and incentives for teachers and enterprise partners. For teachers, it implies a shift from covering content to designing tasks and assessments that make standards visible and require reflection. For enterprise partners, it implies a more active educational role, including mentor selection, training, and recognition. For policymakers, it implies the need for standards, funding mechanisms, and recognition systems that support long-term collaboration rather than short-term projects. The framework can also inform the revision of talent cultivation plans: rather than adding a separate “craftsmanship” module, colleges can map craftsmanship elements across existing courses and practical training, identify gaps, and adjust assessment criteria.

5.3. Limitations and Future Research

The framework is contextually situated in Chinese vocational education. Its concepts-particularly curriculum-embedded values education-reflect Chinese policy and institutional arrangements, and their translation into other contexts requires careful adaptation. The indicators also require local validation. Future research could proceed in three directions: action research in a small number of vocational colleges could examine how the five dimensions interact in practice, which mechanisms are most consequential, and what obstacles arise; longitudinal studies could track students' craftsmanship dispositions and career trajectories over time; and comparative research could examine how institutional governance, enterprise commitment, and regional labor markets shape implementation. Research that includes students' own perspectives-how they understand craftsmanship, what they find meaningful, and where they experience dissonance-would be particularly valuable.

6. Conclusion

The craftsmanship spirit is often invoked as a remedy for quality problems, skills shortages, and weak professional values. This paper has argued that it is better understood as a developmental outcome that requires deliberate educational design. The five-dimensional pathway proposed here-curriculum teaching, practical training, campus culture, school–enterprise collaboration, and teaching staff-offers a way to organize that design. Each dimension serves a distinct educational function, and together they create a coherent environment in which students can understand standards, practice them, identify with them, and encounter them in real work.

The pathway is not a formula. Its implementation depends on institutional context, the quality of teaching and mentoring, and the willingness of schools and enterprises to share responsibility. The collaborative mechanism proposed here is intended to make that sharing concrete: shared goals, co-constructed curricula, shared faculty, joint assessment, and shared resources. Evaluation should be built in from the beginning, not added at the end, and it should focus on whether students are developing the knowledge, habits, and commitments that craftsmanship requires. Ultimately, craftsmanship education is not a matter of adding more slogans to walls or more lectures to timetables. It is a matter of designing the conditions under which careful work becomes meaningful, visible, and worth sustaining.

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