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Research on Integrated Curriculum-Based IdeologicalPolitical Construction of *Ergonomics* Guided by the OBE Concept

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Abstract: Designoriented highereducation majors in the new era attach equal importance to technical competence training and value shaping. The OutcomesBased Education (OBE) philosophy offers a brandnew reform pathway for systematic curriculumbased ideologicalpolitical development. As a core foundational course for environmental design, *Ergonomics* integrates theoretical knowledge with handson practice, and inherently contains diverse ideologicalpolitical connotations, including human-centered care, craftsmanship spirit, and cultural inheritance. Current curriculumbuilding challenges include loosely aligned teaching objectives, superficial integration of ideologicalpolitical elements, singlefaceted assessment frameworks, and insufficient digitalintelligent empowerment. Drawing on teachingreform practices and the educational characteristics of environmental design, this paper explores an integrated development pathway for deep integration between OBE and curriculumbased ideologicalpolitical education from four dimensions: objective restructuring, resource establishment, assessment optimization, and digitalintelligent innovation. It provides practical references for competencyoriented teaching of foundational design courses.

Keywords: OBE concept; *Ergonomics*; Curriculum-based ideological-political education; Integrated construction; Environmental design

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1. Introduction

With the advancement of the “Double FirstClass” initiative, newera aesthetic education and curriculumbased ideologicalpolitical reforms, talent cultivation for university design majors goes beyond technical knowhow to foster comprehensive literacy and professional ethics. As a compulsory sophomore foundational subject for environmental design, *Ergonomics* underpins subsequent core courses such as spatial design and furniture design. Integrated curriculum construction guided by OBE helps resolve the widespread disconnect between professional instruction and valueoriented education, and cultivates design professionals equipped with both professional proficiency and moral integrity.

2. Overview of the OBE concept

OutcomesBased Education (OBE) shifts away from conventional lecturecentered teaching logic. Its core principle lies in orienting teaching toward students' final competency outputs and professional attainment. Curriculum goals, teaching content, practical training and assessment systems are designed backward from expected learning outcomes. OBE serves as a key guiding framework for developing firstclass university courses and exemplary ideologicalpolitical curricula. Compared with theoreticallydriven disciplines in arts, humanities, science and engineering, environmental design features strong practicality and industry relevance. Talenttraining effectiveness is ultimately reflected in design practice, project delivery and community service. Such professional traits render OBE highly applicable to foundational designcourse reforms.

As an introductory core foundation course, *Ergonomics* builds upon preliminary artistic training and prepares students for advanced design practice. Instruction emphasizes not mechanical memorization of theoretical formulas, but the development of humancentered design thinking, alongside methodologies adapted to Chinese physicalpsychological traits and the needs of diverse user groups [1]. Targeting sophomore learners, OBE helps mitigate longstanding drawbacks of traditional foundational courses: overemphasis on theory over practice, and technical skills over humanistic literacy. Distinct from standardized general curricula, this OBEdriven reform focuses on four educational priorities: allagefriendly design, livelihoodoriented spatial improvement, regional cultural inheritance, and ecologically friendly habitat creation, which closely correspond to graduation requirement indicators for environmental design.

Logically, OBE's closedloop educational system aligns well with the subtle, immersive objectives of curriculumbased ideologicalpolitical education. Traditional ideologicalpolitical practices often suffer from fragmentation and formalism. OBE backwarddesign provides structural support for systematic embedding of valueladen elements. Cultural confidence, craftsmanship and social responsibility are no longer addons, but essential components of expected student competency outcomes. This mutually adapted reform consolidates talenttraining foundations for environmental design, enabling foundational courses to fulfill dual missions of moral cultivation and professional grounding.

3. Difficulties in integrated ideologicalpolitical construction of *Ergonomics* under OBE guidance

3.1. Disconnected curriculum objectives: Misalignment between OBE outcomes and ideologicalpolitical education

Conventional curricula are structured around textbook knowledge sequences, consisting of theoretical lectures, case appreciation and basic assignments, without backward mapping against graduationrequirement benchmarks. Knowledge, ability and qualityrelated objectives defined in syllabi overlap vaguely, lacking concrete implementation standards and measurable outputs. Ideologicalpolitical themes embedded within the subject — humanistic concern, ecological livability, cultural confidence and professional craftsmanship — are sporadically introduced through isolated case studies. There exists no systematic chapterwise matching or progressive cultivation rhythm.

In practice, this fragmented method of embedding ideological and political content creates a disconnect between technical skill training and value development. Although students are able to master practical design competencies including human scale measurement and spatial accommodation, they seldom integrate social responsibility and humanistic consideration into their design reasoning. The closed-loop outcome development

central to the OBE framework cannot be fully achieved. This leads to a structural imbalance in curriculum delivery, where technical proficiency is stressed at the expense of holistic literacy. Such a model falls short of the contemporary goal of nurturing design practitioners with both ethical grounding and technical mastery.

3.2. Limited ideologicalpolitical carriers: Shallow integration with professional content

Preliminary ideologicalpolitical attempts rely mainly on inclass case explanations and simple postclass spatial investigations to introduce valuerelated content. Nevertheless, instructional carriers remain limited. A holistic instructional framework covering preclass preparation, inclass workshops, postclass creation and result critique has not been fully established. Most ideologicalpolitical messages remain at cognitive levels without deep anchoring in handson professional practice.

Localized teaching resources specific to Tangshan are insufficient. Realworld scenarios such as campus publicspace renewal, optimization of agingcommunity infrastructure and upgrading of regional residential environments are underutilized as teaching materials. Core professional topics including anthropometric application, barrierfree spatial planning and habitat improvement are loosely coupled with themes of cultural heritage, public welfare and ecological conservation. Superficial integration perpetuates formalism and prevents ideologicalpolitical ideas from becoming designers' spontaneous professional ethos.

3.3. Inadequate processoriented assessment: Lack of quantitative closedloop mechanisms for educational outcomes

Traditional assessment prioritizes finalterm theoretical examinations and design deliverables, paying insufficient attention to learning trajectories and ideologicalpolitical performance. Detailed rubrics, quantitative grading standards and learningprogress tracking logs for formative assessment are not standardized. Evaluation of classroom engagement, online learning and practical training remains subjective without unified benchmarks.

More critically, existing assessment contains no quantifiable metrics for ideologicalpolitical effectiveness. Humanistic awareness, craftsmanship and cultural innovation demonstrated in student work cannot be objectively measured. Teaching teams cannot reliably interpret realworld learning evidence from practical outputs to judge the attainment of professional and moral objectives. Such resultcentered singletrack evaluation violates OBE's core requirements of continuous improvement and closedloop quality enhancement, depriving instructional iteration of empirical evidence.

3.4. Superficial smartteaching adoption: Immature digitalintelligent educational ecosystem

Ergonomics deploys the Chaoxing Learning Platform for blended learning, supporting material distribution, assignment submission and basic online Q&A. Nevertheless, the integration of digital and intelligent teaching tools with classroom-based education and curriculum reform remains superficial overall. Innovative teaching scenarios enabled by smart classrooms have not been adopted on a routine basis.

Informationaided instruments mostly perform administrative teaching functions rather than participating in core educational activities: dynamic learningneed diagnosis, differentiated instruction, peer review of student work and personalized valueoriented guidance. OBE reform, ideologicalpolitical embedding and digitalintelligent technology operate in isolation without synergistic interaction. The educational potential of digital intelligence remains untapped; smartclassroom construction becomes formalistic and fails to underpin

integrated curriculum development.

4. Practical strategies for the integrated curriculum construction of curriculum-based ideological-political education in the course of *Ergonomics* guided by the OBE concept

4.1. Restructuring backwarddesigned objectives anchored to dualdimensional educational priorities

Based on OBE outcomeoriented logic and talenttraining specifications for environmental design, the teaching team comprehensively revised the *Ergonomics* syllabus. The conventional knowledgedriven forwarddesign paradigm is replaced by backwarddesign centered on student competency and literacy outputs. The revised curriculum framework refines three-dimensional educational objectives: knowledge consolidation, competency enhancement, and literacy cultivation. It defines the expected professional competency outcomes and core ideological goals for each chapter and every practical training task, establishing a precise support system where curriculum objectives, teaching content, practical projects and educational outcomes correspond one-to-one.

At the knowledge level, it focuses on core contents including anthropometry, spatial scale adaptation, ergonomic furniture design and human settlement environment optimization to consolidate students' theoretical foundations in the discipline. At the competency level, it prioritizes the cultivation of practical capabilities such as site investigation, scale measurement, schematic design and problem optimization. At the literacy level, ideological elements including universal-age care, cultural confidence, craftsmanship spirit, ecological design and social responsibility are systematically integrated to realize the simultaneous development of professional skills and value awareness. To address the fragmentation of ideological and political content in prior teaching, the revised syllabus assigns exclusive ideological themes to each teaching module, creating a stable correspondence between theoretical instruction and value-based education.

Take the chapter on human scale measurement as an example. Teaching activities are no longer limited to memorizing dimensional data and practicing measurement methods. By introducing variations in human body dimensions across ethnic groups, age cohorts and social groups, instructors guide students to recognize the limitations of directly adopting foreign design datasets and understand the importance of localized design rooted in the physical and psychological characteristics of Chinese users. While completing field measurement training for campus public facilities, students master professional surveying skills and gradually develop localized design thinking together with a rigorous and truth-seeking research attitude. In this way, the cultivation of craftsmanship spirit and cultural confidence is grounded in concrete professional practice [2].

4.2. Deepen the integrated pathway of discipline-based ideological education and build a full-module educational resource system

Built upon the core philosophy of human-centered design in the course, the teaching team moves beyond the practice of embedding ideological content only through isolated classroom cases. Ideological education runs through the whole teaching workflow: theoretical lectures, field investigations, on-site spatial measurement, schematic design and result presentation. Aligned with the industry attribute of environmental design, which serves human settlements and closely connects to people's livelihoods, four core ideological pillars are identified: all-age inclusiveness, care for people's livelihoods, ecological habitability and inheritance of regional culture. The team excavates implicit educational resources within the curriculum to promote

deep coupling between ideological elements and professional instruction, so as to avoid the separation of ideological education from professional teaching [3].

Drawing on the team's accumulated experience in teaching reform concerning regional culture, the course develops a targeted case library of ideological resources set in local Tangshan contexts. The library includes localized design cases such as spatial renewal of old urban communities, optimization of publicly accessible facilities, upgrading of riparian ecological living spaces, and inheritance of scale principles in traditional dwellings. Unlike generic online cases, these local cases fit students' practical training scenarios. They allow students to directly perceive the core value of design in serving urban development and residents' lives, strengthening their sense of professional responsibility and social service awareness. Meanwhile, the teaching team learns from mature practices of curriculum-based ideological education and adopts a point-line-plane integration logic to connect ideological points across chapters and form a systematic educational thread.

Take the practical training on micro-renewal of communities as an example. Instead of adopting the traditional mode of designing hypothetical schemes, the course organizes students to visit nearby aging communities and conduct field research on ergonomic mismatches of public seats, pedestrian spaces and convenience facilities. Targeting practical pain points including inadequate rest spaces for the elderly, unreasonable scale of children's activity areas and insufficient accessible facilities, students develop optimized design schemes based on ergonomic theories. Throughout the training, students not only practice their professional design competencies but also gain a tangible understanding of the livelihood value of design. This naturally fosters humanistic literacy to care for vulnerable groups and serve grassroots society, allowing ideological education to move beyond empty preaching and align with industrial realities and social demands.

4.3. Improve the multi-dimensional closed-loop evaluation mechanism to achieve iterative upgrading of educational outcomes

In line with the core requirement of continuous improvement in OBE philosophy, the course abandons the traditional single summative assessment model and establishes a multi-evaluation system combining formative and summative assessment. Quantitative criteria for ideological literacy are also refined, forming a complete quality loop covering teaching implementation, multi-source assessment, outcome analysis and teaching optimization. The assessment weighting is restructured into a 100-point framework: 60 points for offline performance evaluation, 30 points for online outcome evaluation and 10 points for innovation competency evaluation. Scoring rubrics and quantitative standards are specified for each assessment component.

Formative assessment covers multiple dimensions, including classroom engagement, online chapter quizzes, after-class practical assignments, group research presentations, and scheme iteration. It mainly records students' rigorous attitude, collaborative capacity, innovative thinking and performance in practicing value concepts during learning. Summative assessment focuses on examining students' mastery of theoretical systems and comprehensive design application abilities. Examination questions balance professional standards and value orientation, incorporating assessment dimensions such as human-centered design, ecological environmental protection, and cultural inheritance. Innovation competency is comprehensively evaluated based on students' participation in design competitions, creation of original schemes and capacity to solve real-world problems, through a multi-evaluation method combining self-assessment, peer review and instructor feedback.

Take the final course design assessment as an example. Evaluation criteria no longer merely judge the aesthetic quality and dimensional accuracy of schemes. Additional ideological dimensions are introduced,

including humanistic adaptability, cultural innovation, social value and ecological compatibility. Quantitative bonus points are awarded for accessible design, application of traditional cultural elements and solutions to livelihood-related pain points reflected in students' proposals [4]. The teaching team maintains complete archives of assessment records, exam reviews and student outputs for each cohort. Annual reports on the attainment of course objectives are compiled to pinpoint teaching weaknesses and educational biases. This provides data support for subsequent curriculum reform and optimization of ideological integration, enabling dynamic iteration of educational outcomes.

4.4. Advance digital-intelligent teaching reform and innovation to build a new paradigm of smart education

Leveraging the hardware of smart classrooms and the Chaoxing Learning Platform deployed by the university, the course comprehensively promotes digital-intelligent teaching reform. It breaks the constraints of traditional offline one-way lectures and constructs a smart education paradigm featuring independent online inquiry, focused offline lectures and practical training, together with targeted whole-process support. In accordance with curriculum development plans, no fewer than six innovative teaching sessions are delivered in smart classrooms each academic year. New teaching modes, including flipped classrooms, group project seminars, immersive case analysis, and on-site peer review of outputs, are regularly implemented to enrich classroom education.

The teaching team fully explores the educational potential of diverse information tools and moves beyond basic functional use. Pre-class learning diagnosis is carried out via the Chaoxing Learning Platform. Classroom priorities are dynamically adjusted according to students' preview data and feedback to realize differentiated and targeted instruction. Technologies such as three-dimensional modelling, virtual simulation and 3D visualization convert abstract principles of human scale and spatial adaptation into intuitive visual scenarios, lowering barriers for students to grasp theoretical knowledge. Virtual environments are also used to deliver practical training on ideological themes such as accessible space design and human settlement optimization, expanding the scenarios for value cultivation.

Take flipped classroom practice as an example. Before class, instructors share extended resources through the Chaoxing Learning Platform, including scale rules of traditional furniture, Chinese spatial layout and variations in human body dimensions among Chinese populations, guiding students to preview independently and identify questions. During class, group discussions are held on smart classroom screens. With reference to virtual simulation models, students compare differences in human settlement design scales between China and foreign countries, analyzing craftsmanship spirit and cultural connotations embedded in traditional mortise-and-tenon furniture and classical spatial layouts. After class, peer review of works and targeted instructor comments are conducted on the platform, with records kept of students' innovative thinking and cultural understanding. The in-depth application of digital-intelligent technologies connects the educational chain of OBE outcome attainment, ideological immersion and professional competency improvement, greatly enhancing the overall effectiveness of integrated curriculum development [5].

5. Conclusion

The integrated development of ideological education in the *Ergonomics* course is an inevitable choice for foundational design courses to implement the fundamental task of fostering virtue through education and meet

talent cultivation demands in the new era. Adopting the backward design and closed-loop educational logic of OBE, the course effectively addresses previous limitations: disjointed objectives, shallow integration, single evaluation modes and insufficient enabling support. Through multi-dimensional practices including objective restructuring, resource development, evaluation optimization and digital reform, the course establishes an educational pattern where competency training, literacy shaping and value guidance advance in synergy. Moving forward, the teaching team may continuously optimize local ideological resources, refine educational evaluation criteria and further improve the curriculum system. It can offer practical insights for standardized and routine implementation of ideological education in design courses.

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