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Research on the Collaborative Talent Cultivation Model of "Teaching–Research–Training–Competition" for E-Commerce Majors in the Context of Industry–Education Integration: A Case Study of the "JD Class"

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Abstract

Against the backdrop of the digital economy, e-commerce education commonly struggles with curricula that lag behind industrial practice, shallow industry–education integration, and a weakly articulated synergy among teaching, research, practical training and competition. Drawing on Outcome-Based Education (OBE) and on China's policy agenda for deepening industry–education integration, this paper examines three years of practice in the "JD Class", a joint programme operated by Suqian University and JD.com, and develops a "four-in-one" model in which teaching, research, training and competition are structurally coupled and mutually reinforcing. The model rests on four design choices: a competency-driven reconstruction of the curriculum around platform operations, data analytics, content marketing, customer service and supply-chain coordination, delivered through authentic JD business tasks under a dual-instructor arrangement; a three-tier practical training system that progresses from campus simulation, through rotation-based internships in JD's regional operations, to venture incubation; a course–competition integration mechanism in which competition rubrics, deliverables and judging criteria are embedded in course assessment; and a joint governance mechanism in which the firm takes part in curriculum design, textbook development and student assessment. Evidence from three years of implementation indicates that students' operational, analytical and project-delivery capabilities improved markedly, that employers report faster onboarding with average ramp-up time shortened by nearly 40 per cent, and that the programme has catalysed curriculum renewal and the development of "dual-qualified" faculty. The paper closes with implications for local applied universities and with an agenda for longitudinal, multi-case evaluation.

Keywords

Industry–education Integration; Teaching–research–training–competition Integration; E-commerce; Applied Talent Cultivation; JD Class.

1. Introduction

As the digital economy deepens and the platform economy continues to evolve, e-commerce has moved rapidly beyond a single online-transaction model towards intelligent, full-chain and ecosystem-based operations. In this context, firms increasingly require composite professionals who combine a data-driven mindset with solid technical capability. The cultivation of e-commerce talent in Chinese universities, however, exhibits a pronounced structural mismatch between supply and demand [1]. First, curricula are updated more slowly than the industry iterates, so that classroom teaching struggles to cover the core competencies demanded by emerging business forms: livestream commerce operations, the refined

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management of private-domain traffic, and artificial-intelligence-driven product selection. Second, practical teaching is largely confined to virtual simulation software and low-complexity mock exercises. It lacks the stress-testing and closed-loop feedback mechanisms that only authentic business scenarios and representative projects can provide, with the result that graduates take longer to adapt to their posts and remain insufficiently prepared for uncertain business challenges [2]. This structural dislocation between the education chain and the industrial chain has become a key bottleneck constraining the connotative, quality-oriented development of the new liberal arts and the digital transformation of local economies.

Although a substantial body of research has emerged on industry–education integration and on the "post–course–competition–certificate" (gang–ke–sai–zheng) integrated model, existing studies display clear limitations. First, most focus either on macro-policy interpretation or on isolated reforms of a single teaching link; few systematically reveal the internal logic, the dynamic coupling and the synergy-enhancing pathways that connect the four dimensions of teaching, research, training and competition. Second, school–enterprise cooperation usually remains superficial, taking the form of company visits and guest lectures, and has not yet produced institutionalised arrangements under which leading firms participate deeply in student selection, co-construction of course standards, embedded guidance within real projects and whole-process collaborative cultivation. Cooperation therefore persists in a loose state best described as "integration without fusion, coordination without alignment". Most notably, on the two questions of how research outputs can be converted into teaching resources and how high-level competition projects can feed back into curriculum reconstruction and the optimisation of a competency map, the literature offers little systematic guidance that is simultaneously direction-setting, feasible in implementation and able to generate feedback in process. This paper therefore takes the "JD Class" at Suqian University as a typical case and addresses the following core question: how can an integrated cultivation programme that organically combines teaching, research, practical training and competition be systematically designed and efficiently implemented, so as to raise both the quality of applied undergraduate e-commerce education and its fit with industrial demand?

2. Literature Review

With the rapid development of the digital and platform economies, the competency requirements placed on e-commerce professionals have changed profoundly. The demand profile has expanded from the traditional operational and execution level towards a multidimensional mix of data analysis, platform operations, content marketing and entrepreneurial innovation [3]. How to cultivate e-commerce talent that meets the needs of this new era has accordingly become an enduring concern in scholarship both in China and abroad, and a body of referential findings has accumulated.

Research outside China began earlier and initially centred on Competency-Based Education (CBE) and on the mechanisms through which authentic occupational settings shape the quality of talent development. On this foundation, Outcome-Based Education (OBE) has been increasingly fused with engineering education paradigms. The dominant position is that programme design should take actual industry requirements as its logical starting point and construct a closed loop linking three elements: educational objectives, instructional processes and the assessment of learning outcomes [4, 5]. Empirical work informed by the CDIO (Conceive–Design–Implement–Operate) model, for instance, shows that systematically embedding full-life-cycle capability requirements into the curriculum can effectively bridge the long-standing gap between theoretical instruction and engineering practice [6]. Second, research on industry–education integration is shifting from surface-level collaboration-joint internship bases, co-hosted events-towards deeper governance mechanisms. Systemic

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analytical models, notably the triple-helix framework of university–industry–government interaction, identify multi-stakeholder co-governance among universities, firms, government and industry associations as the key pathway towards institutional alignment, value congruence and functional fit between the education supply system and industrial chains [7]. Third, Situated Learning Theory has been widely applied in the design of practical instruction. Involving company experts in project evaluation and designing immersive activities around authentic job tasks is shown to build a virtuous cycle of teaching, learning and practising with dynamic feedback, thereby fostering higher-order thinking and complex problem-solving [8]. Notwithstanding these advances, overseas findings still lack universal standards at the operational level, are of limited replicability in practice, and their applicability across cultural contexts remains to be further validated.

Domestic research on e-commerce talent cultivation has unfolded mainly under the policy orientations of "deepening industry–education integration" and "building the new business disciplines". It is characterised by rich experimentation with models but limited theoretical distillation, and by substantial accumulation of practical experience without systematic synthesis. On the one hand, in order to resolve the persistent structural imbalance between talent supply and demand, a research wave guided by the "post–course–competition–certificate" integrated model and by the "dual-track" approach, in which campus-based theoretical study runs in parallel with firm-based workplace training, has taken shape [9, 10]. Such studies advocate reverse-engineering the curriculum from a competency map of typical occupations and, supported jointly by academic competitions and vocational certification, strengthening students' occupational competence and employability. On the other hand, given the fast technological iteration, the strong evolution of business forms and the high degree of ecosystem coordination that characterise e-commerce, scholars have explored integration pathways adapted to Chinese conditions, for example co-building comprehensive off-campus practical teaching bases, co-developing specialised courses for economics and management majors jointly with firms [11], or establishing industry colleges jointly with leading firms-the "JD Class" and "Alibaba Class" being prominent examples-in order to achieve dual-subject collaborative cultivation, co-construction and sharing of resources, and a pattern in which risks and benefits are shared [12, 13]. Although such practices have produced results, two clear weaknesses remain. First, most studies rest on the interpretation and extension of national policy texts and pay insufficient attention to the construction of localised concepts and the generation of systematic theory with Chinese characteristics. Second, rigorous empirical research is still scarce, especially research that tracks implementation over a long period, evaluates it along multiple dimensions and probes the underlying causal mechanisms.

Taken together, the literature converges on three points. First, e-commerce talent cultivation must remain fundamentally oriented towards industrial demand; a competency orientation is rapidly displacing a knowledge orientation as the inevitable direction of business education in the new era. Second, deepening school–enterprise collaboration is the core guarantee of quality, since unilateral reform by universities alone cannot overcome deep-seated institutional obstacles [14]. Third, disciplinary boundaries must be dismantled so that digital technology, business management and innovative practice are integrated, nurturing in authentic commercial ecosystems composite business professionals equipped with solid digital skills, sharp commercial insight and a capacity for continuous innovation. Yet three gaps remain. First, there is no overarching and internally coherent theoretical framework. Current studies concentrate on a single dimension-curriculum development, base construction or competition systems-and rarely treat teaching, research, training and competition as an organic whole, construct a clearly structured, well-connected and closed-loop integrative model, and subject it to systematic empirical testing. Second, the mechanism through which leading platform firms act across the whole cultivation process remains largely a black box. Much has been written at

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a macro level about the principles, pathways and institutional design of school–enterprise cooperation, but how firms such as JD.com and Alibaba are substantively embedded in each link of talent cultivation, what their internal operating logic is, how rights, responsibilities and interests among multiple stakeholders are allocated, and what motivates sustained corporate investment have not been examined through close qualitative inquiry. Third, research addressing applied undergraduate universities is markedly insufficient. Existing work concentrates on two typical settings, higher vocational colleges and research-oriented universities, and has not produced systematic, differentiated conclusions about how the e-commerce curriculum in applied undergraduate institutions should fit their regional industrial environment, institutional positioning and student profile. This paper therefore selects the representative "JD Class" at Suqian University as its object of study and undertakes a close deconstruction and mechanism analysis of its four-in-one school–enterprise collaborative model, in order to offer a transferable practical paradigm and theoretical insight for local applied universities seeking to deepen industry–education integration and optimise talent cultivation pathways.

3. Constructing the "Teaching–Research–Training–Competition" Collaborative Cultivation Model: The Case of the "JD Class"

To address the problems that beset conventional e-commerce education-curricula detached from posts, practice separated from teaching, and competition disconnected from cultivation-the e-commerce programme at Suqian University has drawn on the industrial and platform resources of the JD Group to design and implement, on the basis of systematic investigation, a four-in-one and mutually reinforcing model of applied talent cultivation comprising teaching, research, practical training and competition. Taking the development of students' applied competence as its main thread and concrete work tasks as its carriers, the scheme pursues reform along four lines: optimising the curriculum, building practical bases, integrating courses with competitions, and managing school–enterprise cooperation. A cultivation model that is directional, explicit, reasonable and feasible has gradually taken shape.

3.1. Reconstructing the Curriculum around Occupational Competencies

The curriculum is a principal route to the growth of applied talent and performs a supporting function throughout the cultivation process. Drawing on the competency requirements of typical e-commerce occupations, the "JD Class" has split, consolidated and upgraded the existing curriculum around five principal professional capabilities: platform operations, data analysis, content marketing, customer service and supply-chain coordination. The resulting system is organised in three tiers. The foundational tier comprises such content as the fundamentals of the digital economy, the principles of online marketing and an introduction to e-commerce. The professional tier strengthens practice in platform operations, data-informed decision-making, livestream commerce operations and intelligent supply-chain management. The integrative tier is built on authentic project-based training, innovation and entrepreneurship training, and comprehensive end-to-end operations exercises, with the aim of producing graduates with strong occupational competence and sound occupational adaptability. Course content is designed to be project-based and task-based: specific JD business operations-merchandise listing management, marketing campaign planning, user-growth operations and traffic-conversion optimisation-are assigned to students as discrete project tasks, so that knowledge is understood and consolidated in the very act of solving problems. In the course E-Commerce Operations Practice, for example, students work from real store data to analyse traffic-source structure, plan marketing campaigns and devise measures to raise conversion rates, thereby binding classroom learning to the concrete work of the enterprise. Teaching in the "JD Class" follows a "dual-instructor" arrangement: university

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teachers explain theory, transmit methodology and supervise learning, while enterprise mentors supply concrete cases, lead practical activities and comment on student performance. Enterprise mentors also teach on campus at regular intervals, bringing the latest platform operating rules, industry trends and their own front-line experience into every class, which lends the curriculum strong practicality, timeliness and relevance.

3.2. A Practical Training System Grounded in Authentic Scenarios

Practical teaching is an essential component of applied e-commerce education and a key route to employability and professional quality. In the "JD Class" it is delivered through the school–enterprise platform as a tiered and progressive sequence: campus simulation, enterprise practice and venture incubation. In the campus simulation stage, the university and JD have jointly built a comprehensive e-commerce training platform that reproduces, with high fidelity, merchandise operations management, intelligent customer-service systems, multidimensional data analysis, and warehousing and distribution management, enabling students to receive operationally intensive basic skills training in a comparatively realistic environment and thus to pass from theory to practice and application. In the enterprise practice stage, students enter JD's regional operations centre, customer-service operations base, logistics hub and marketing division in batches for post-based internships; during rotation they handle customer enquiries and order fulfilment, take part in on-site and off-site marketing campaigns, and come to understand how the company operates, what each post involves and how departments cooperate. Compared with the single visit or short observation period common in the past, the distinguishing feature of the "JD Class" is that practical tasks are tightly bound to cultivation objectives, so that students exercise, in real work, the ability to identify problems, solve them and handle contingencies. In the venture incubation stage, supported by a provincial innovation and entrepreneurship education practice base, students are guided towards entrepreneurial experiments in campus e-commerce services, vertical-domain livestream marketing and cross-border e-commerce agency operations for small and medium-sized enterprises. Some students have already opened and are running their own stores on JD's campus platform, achieving an integrated progression from course learning through project training to entrepreneurial practice, which has proved conducive to their entrepreneurial awareness, market acumen and comprehensive operational capability.

3.3. A Competence-Enhancement Mechanism Driven by Course–Competition Integration

Academic competition is an effective means of examining and cultivating innovative awareness, hands-on ability and team spirit, and plays a prominent role in applied talent cultivation. The "JD Class" has concentrated on building a comprehensive capability-development model of "course–competition integration and competition–entrepreneurship linkage", systematically incorporating the scoring criteria, task requirements and deliverable formats of high-level contests-the National University Student E-Commerce "Innovation, Creativity and Entrepreneurship" Challenge (the "Three-Chuang" competition) and the National Cross-Border E-Commerce Innovation and Entrepreneurship Ability Competition-into routine course assessment. In E-Commerce Comprehensive Training, for instance, the course is organised around the end-to-end operation of a complete business project: students successively conduct market research, competitor analysis, business-model design, preparation of an operating plan and a simulated roadshow defence, and the course output can be submitted directly as a competition entry, so that competition serves learning. Second, the criteria used to evaluate real work in the enterprise are introduced in order to sharpen the focus of competition preparation. Enterprise mentors take part throughout, from the screening of competition topics and the mid-term review to the final defence, and assess team deliverables comprehensively in terms of market fit, operational soundness and technical novelty, so that students gradually

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internalise a user-centred design philosophy pursued together with sound economic returns. A threefold support mechanism-guidance by campus teachers across the board, dedicated coaching by enterprise mentors, and collaboration across year groups-further ensures continuity, coherence and steadily improving quality of output throughout the competition period. This way of working has markedly raised student motivation and the quality of practical engagement and has in turn improved classroom teaching: in guiding students through competitions, teachers continually refine course design, enrich teaching cases and reform assessment methods, so that instruction, practice and competition are organically combined and mutually reinforcing.

3.4. The Collaborative Operating Mechanism of the Four-in-One Model

The essence of the four-in-one model lies not in the simple addition or juxtaposition of its parts but in the relations of mutual influence and mutual reinforcement among them. In implementation the four constitute a single whole, sharing a common objective and supporting one another. Teaching is the foundation: classroom instruction raises students' disciplinary knowledge, methodological competence and critical thinking. Training is the bridge: through concrete cases students acquire skills and develop engineering habits of mind and professional dispositions. Competition is the driver: project-based contests cultivate a sense of achievement, team spirit and the capacity to work under pressure. Research is the wellspring: the enterprise-commissioned projects, industry consultancy, publicly funded research and typical cases in which teachers are engaged are continuously fed back into the classroom, keeping course content abreast of the times. Table 1 summarises the function, carrier and observed effect of each component.

Table 1. The four components of the teaching–research–training–competition model: functions, carriers and observed contributions.

Component	Function in the model	Principal carrier	Observed contribution
Teaching ("jiao")	Foundation: builds disciplinary knowledge, methodological competence and critical thinking	Competency-based modular curriculum; dual-instructor classroom; JD business tasks assigned as projects	Stronger grasp of operations roles; course outputs usable as competition entries
Research ("ke")	Wellspring: renews content by feeding commissioned projects, consultancy and cases back into teaching	Enterprise-commissioned (horizontal) projects; industry consultancy; publicly funded research; teaching cases	Timely coverage of platform algorithms, AIGC marketing and data middle-platform management
Training ("xun")	Bridge: converts knowledge into skill, engineering habits of mind and professional disposition	Campus simulation platform → post-based rotation in JD units → venture incubation	Faster role adaptation; average ramp-up time shortened by nearly 40 per cent
Competition ("sai")	Driver: mobilises motivation, teamwork and performance under pressure	"Three-Chuang" challenge; cross-border e-commerce innovation competition; livestream e-commerce competition	Awards and venture formation; evidence-based reform of course assessment

Source: compiled by the authors from the implementation documents and teaching records of the "JD Class".

The university and the enterprise have also jointly established a long-term mechanism for collaborative cultivation. They agree on the cultivation plan, work together on course standards, exchange teaching resources to mutual benefit, support one another in building internship and

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training bases, and share responsibility for assessing student achievement. The enterprise is involved not only in internship and training but also, and in advance, in course design, the writing of teaching materials and even examination marking, which substantially improves the precision with which the supply side of talent cultivation meets the demand side of industry.

4. Implementation Outcomes and Evaluation

To examine the effects of the four-in-one model, this section reviews the teaching of the "JD Class" over the past three years in terms of improvements in student competence, the effectiveness of practical activities and the state of school–enterprise cooperation. The conclusion is that collaborative cultivation of this kind considerably strengthens students' hands-on capability and their integration into work, and contributes to curriculum reform.

4.1. Marked Gains in Students' Professional and Practical Competence

Compared with conventional arrangements, students in the "JD Class" are stronger in platform operations, data analysis and project delivery. First, the project-based curriculum deepens their understanding of real work. In E-Commerce Operations Practice and Data-Driven Marketing, for example, students analyse merchandise promotion, day-to-day store operations and campaign planning and put forward recommendations, which markedly improves their grasp of the work and their problem-solving ability. Second, embedded internships and job rotation help students adapt to posts more quickly. The authentic commercial platform built through school–enterprise cooperation allows students to learn and master, while still at university, the business rules, operating methods and collaboration patterns of mainstream e-commerce platforms, so that they move seamlessly into the working environment upon graduation. Employers report that "JD Class" graduates are considerably better than their peers in the speed with which they take up work, in cross-departmental cooperation and in communication, and that their average ramp-up time is shortened by nearly 40 per cent. Third, the integrated course–competition model mobilises student initiative. Through sustained participation in high-level contests such as the "Three-Chuang" competition and the livestream e-commerce innovation and entrepreneurship competition, students improve across the board in project planning, market research, plan implementation and teamwork; some have converted competition entries into genuine e-commerce ventures, realising the principle that competition promotes learning, creativity and application.

4.2. Synergistic Renewal of the Curriculum and of Practical Teaching

The model benefits students and at the same time acts as an important force for pedagogical reform in the e-commerce programme. First, course content is more closely bound to social reality. Whereas earlier courses explained too much theory, offered too little practice and fell behind the industry, the "JD Class" brings real corporate projects into the classroom, acquainting students with such frontier content as the principles of platform algorithms, user-behaviour analysis and private-domain traffic management. Teaching shifts from the transmission of knowledge to task-oriented, project-centred instruction, which greatly stimulates interest and improves students' ability to apply what they learn. Second, joint teaching by campus teachers and enterprise mentors alleviates the shortage of practical teaching resources. Technical specialists and business managers from the enterprise contribute to course standards, teaching cases and classroom delivery, feeding the latest corporate developments and technical requirements back into the university, while campus teachers raise their own engineering practice capability and industry awareness through joint lesson preparation, collaborative research and temporary secondment to the enterprise, accelerating the formation of a high-level "dual-qualified" teaching team. Third, the practice model has been comprehensively upgraded. The "JD Class" ends the pattern of short observation visits and

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fragmented skills training, instituting instead a three-stage progression-practice embedded in courses, post-based rotation in the enterprise, and innovation and entrepreneurship incubation-that runs through the whole sequence of cognition, experience, application and innovation and thus strengthens students' practical capability.

4.3. Practical Implications

The experience of the "JD Class" suggests that pedagogical reform in applied undergraduate e-commerce programmes cannot be confined to piecemeal repair; it must establish a comprehensive model of collaborative cultivation grounded in deep industry–education integration. First, curriculum reform must be market-driven. As e-commerce evolves rapidly and new technologies and tools proliferate, universities need an internal mechanism for regular exchange with large firms and rapid feedback, so that the latest platform rules, AIGC-based marketing techniques and full-domain data middle-platform management are promptly incorporated into courses and students come to understand the current state of the industry. Second, school–enterprise cooperation must be strengthened further. The firm should not be positioned merely as an internship base or a supplier of resources; it should participate across the whole cultivation process-jointly formulating the cultivation plan, co-developing project-based courses, co-supervising graduation theses and jointly establishing diversified assessment methods-so that a cooperative relationship with clear responsibilities, sound operation and shared benefit takes shape and better meets society's demand for talent. Third, the practical teaching system should be integrated more closely with the competition system. From a systemic design perspective, a tiered chain of cultivation-course, project, competition, incubation-should be established, with effective alignment among high-level competition tasks, real corporate engineering projects and on-campus teaching assignments, so that students' capacity for innovation and their team spirit are strengthened while the foundations of their all-round quality are consolidated. The ultimate aim is a shift in applied education from a narrow emphasis on the transmission of knowledge towards competence development and value guidance.

5. Conclusion and Outlook

Taking the "JD Class" of the e-commerce programme at Suqian University as its case, this paper has examined a collaborative model that integrates teaching, research, training and competition. Experience shows that the model-built on curriculum reform, set in authentic commercial scenarios, with competition brought into the classroom and the university and the firm managing the programme jointly-can effectively fuse teaching, learning, practice and competition. Project-based instruction that assigns real corporate tasks in class equips students with platform-operating and data-analytical capabilities; joint delivery by dual-qualified teachers and a progressive practical training design deepen students' engagement in practice and their professional understanding, and help reconstruct and refine the practical teaching system of the e-commerce major. The integration of courses and competitions not only sharpens students' problem awareness, innovative capacity and team spirit but also enriches the content and outcomes of applied talent cultivation. The establishment of the "JD Class" has contributed positively to student development and to school–enterprise cooperation, which to some extent demonstrates that the four-in-one model is highly operable and instructive.

The study nevertheless has limitations. The case is confined to a single university (Suqian University) and a single partner firm (the JD Group), so the sample is small and the proposed model is both context-specific and typical. Future research should extend the comparison to different types of institution-applied undergraduate universities and higher vocational colleges among others-and to different types of enterprise, including platform-based, manufacturing and service firms. Supported by digital teaching evaluation instruments and dynamic

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monitoring methods, such work should track the effects of applied talent cultivation over the long term, evaluate them comprehensively and refine the model iteratively.

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