Curriculum and Teaching Methodology (2026)
Clausius Scientific Press, Canada

DOI: 10.23977/curtm.2026.090515
ISSN 2616-2261 Vol. 9 Num. 5

OBE-Oriented Digital Transformation of University-wide Business Courses in Application-Oriented Universities

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Keywords: Digital Intelligence; Outcome-Based Education; Application-Oriented Universities; University-wide Business Courses; Teaching Reform

Abstract: Against the backdrop of the digital economy and the digital transformation of education, university-wide business courses for non-business majors in application-oriented universities face a mismatch among students' learning needs, instructional provision, and the application of digital-intelligence technologies. Based on 417 valid questionnaires from non-business students, this study examines learning needs, learning difficulties, and the use of artificial intelligence (AI) tools. The findings show that students primarily seek applicable business knowledge, improved employability, and innovation capabilities; the theory–practice gap is a major learning difficulty; and although AI tools are widely used, they are mainly applied to general tasks such as information retrieval and text generation rather than being fully integrated into business-learning scenarios. Guided by Outcome-Based Education (OBE), the study proposes a three-dimensional, nine-element course-objective framework, a teaching model comprising three stages, seven steps, and one thread throughout, and a four-dimensional AI teaching scaffold. It also establishes a data-driven assessment mechanism combining formative and summative assessment. The framework offers practical ideas for developing business literacy among non-business students in application-oriented universities.

1. Introduction

In the era of the digital economy, the rapid development of digital and intelligent technologies, including big data and artificial intelligence (AI), is profoundly reshaping business operations and the structure of talent demand. Enterprises increasingly expect business professionals to possess digital literacy, cross-disciplinary integration capabilities, and innovative thinking. Meanwhile, a series of national policies has promoted the digital transformation of education. In 2024, seven government departments jointly issued the Interim Measures for the Management of Generative Artificial Intelligence Services, emphasizing both the encouragement of innovation and the principle of safety and controllability. In 2025, the Ministry of Education and eight other departments issued the Opinions on Accelerating the Digital Transformation of Education, calling for the development of educational large models and deeper integration of AI into education. Human–AI collaboration and the resulting transformation of intelligent teaching paradigms were

also identified among the global research hotspots in digital education in 2026. Against this background, business education in application-oriented universities urgently needs to shift from conventional knowledge transmission toward the development of digital and intelligent competencies.

Outcome-Based Education (OBE) takes students' intended learning outcomes as its starting point. It clarifies course objectives through backward design and then organizes teaching activities and assessment accordingly, emphasizing the integrated development of students' knowledge, abilities, and qualities. This approach aligns closely with the mission of application-oriented universities to cultivate practical and professional competencies. At the same time, AI, learning analytics, and smart teaching platforms offer new ways to diagnose learning needs, provide personalized support, simulate scenarios, and assess learning processes[1]. Combining OBE with digital and intelligent technologies can therefore help university-wide business courses shift their focus from "what teachers teach" to "what students can ultimately do."

However, general business courses for non-business majors often continue to follow the content structures used in specialized business programs, resulting in inadequate alignment in course objectives, teaching content, practical scenarios, and assessment methods. To establish an empirical basis for reform, the research team conducted a dedicated survey of students majoring in non-business disciplines, diagnosed instructional problems based on the results, and developed corresponding reform strategies.

2. Diagnosis of Teaching Challenges in University-wide Business Courses

To understand learning needs and the current state of university-wide business courses, the research team conducted a survey entitled "Digital Intelligence for Learning and Application" among non-business students. A total of 417 valid responses were collected from students across multiple schools and year levels, including arts and media, German-engineering programs, communications and information, and intelligent engineering. The findings reveal clear needs for reform in learning demands, learning difficulties, and the use of digital and intelligent tools.

2.1. Application-Oriented Learning Needs and Demand for Career Readiness and Innovation

Regarding learning needs, 74.34% of respondents selected "acquiring practical business knowledge and broadening their knowledge base," making it the most common response. Improving future employability and developing innovation or entrepreneurship capabilities were selected by 64.27% and 63.07%, respectively. A further 58.51% expressed a desire for business knowledge to complement their own disciplinary knowledge, while only 0.96% selected "other."

These findings suggest that non-business students are particularly concerned with the practical value of business courses and their contribution to future development. Rather than presenting knowledge solely according to a complete disciplinary system, course content should be organized around the learning outcomes students are expected to achieve. University-wide business courses should therefore start from students' disciplinary backgrounds and learning needs, connecting business knowledge with authentic commercial problems, professional contexts, and cross-disciplinary tasks to strengthen applicability and transfer.

2.2. The Theory-Practice Gap and Disciplinary Differences

Among the reported learning difficulties, "theory is dull and lacks practical application" ranked first at 61.63%, followed by "insufficient prior disciplinary knowledge"(57.07%), "cases are disconnected from reality"(27.34%), "insufficient digital and intelligent content"(26.86%),

“inadequate classroom interaction”(13.19%), and “other”(4.32%). The prominence of the theory–practice gap corresponds with the 77.94% of students who expressed a preference for combining theory and practice. This suggests that students do not reject theoretical knowledge; rather, they need stronger connections between theory and authentic situations.

Notably, the relatively low proportion selecting “inadequate classroom interaction” suggests that students are more concerned with practical relevance and disciplinary fit than with interaction formats alone. Where resources are limited, priority should therefore be given to restructuring course content, embedding authentic scenarios, and providing support for students with different disciplinary backgrounds. Digital interaction tools can serve as supplementary means of improving participation and feedback efficiency.

University-wide business courses also serve learners from diverse disciplines. Students across schools differ in prior knowledge, learning approaches, and application needs. The survey found that 67.01% of students in arts and media expressed a need for interdisciplinary integration, while 78.87% of students in communications and information engineering expected more flexible teaching methods. A uniform approach to content and pacing may consequently create a mismatch between course provision and students’ actual needs. Reform must address not only what to teach, but also whom to teach and how to adapt teaching.

2.3. AI Use and Its Limited Integration into Course Teaching

The survey indicates that the vast majority of respondents have integrated AI tools into their learning routines, with nearly two-thirds using them frequently, demonstrating that AI has become a common component of student learning. Among various learning activities, students engage with AI most extensively for information retrieval, knowledge summarization, and writing support. For these foundational tasks, over half of the users report frequent or regular reliance on AI assistance. Similarly, a substantial proportion of students utilize AI for higher-order tasks—such as case analysis, business planning, creative brainstorming, and quantitative calculations—where frequent usage also remains notably high. Overall, while AI adoption spans a wide spectrum of academic activities, its application is currently heavily weighted toward information processing and text generation, leaving room for deeper integration into specialized business-learning scenarios.The distribution of AI use across different learning tasks is presented in Table 1.

Table 1. Students’ Use of AI Across Learning Tasks.

Learning task	Never	Occasionally	Sometimes	Often	Always	Total
Finding information or summarizing knowledge	3 (0.85%)	84 (23.66%)	83 (23.38%)	156 (43.94%)	29 (8.17%)	355
Writing or report assistance	3 (0.97%)	66 (21.36%)	77 (24.92%)	138 (44.66%)	25 (8.09%)	309
Case analysis and business planning	2 (0.98%)	38 (18.63%)	56 (27.45%)	88 (43.14%)	20 (9.80%)	204
Calculations or programming	4 (2.53%)	31 (19.62%)	36 (22.78%)	67 (42.41%)	20 (12.66%)	158
Brainstorming or creative thinking	1 (0.55%)	37 (20.22%)	39 (21.31%)	81 (44.26%)	25 (13.66%)	183

Regarding attitudes, one third of students believed AI could substantially improve learning efficiency, while most of them viewed its contribution positively. In terms of perceived value, 76.50% identified improved learning efficiency as a key benefit, and 68.59% believed AI could support innovative thinking. By contrast, only 38.37% believed that AI could enhance practical learning experiences. At the teaching-stage level, students perceived the greatest benefit from AI in after-

class assignments and practice support, while its perceived contribution to classroom learning and discussion was lower. Figure 1 summarizes students' perceptions of the value of AI, highlighting its perceived benefits and limitations.

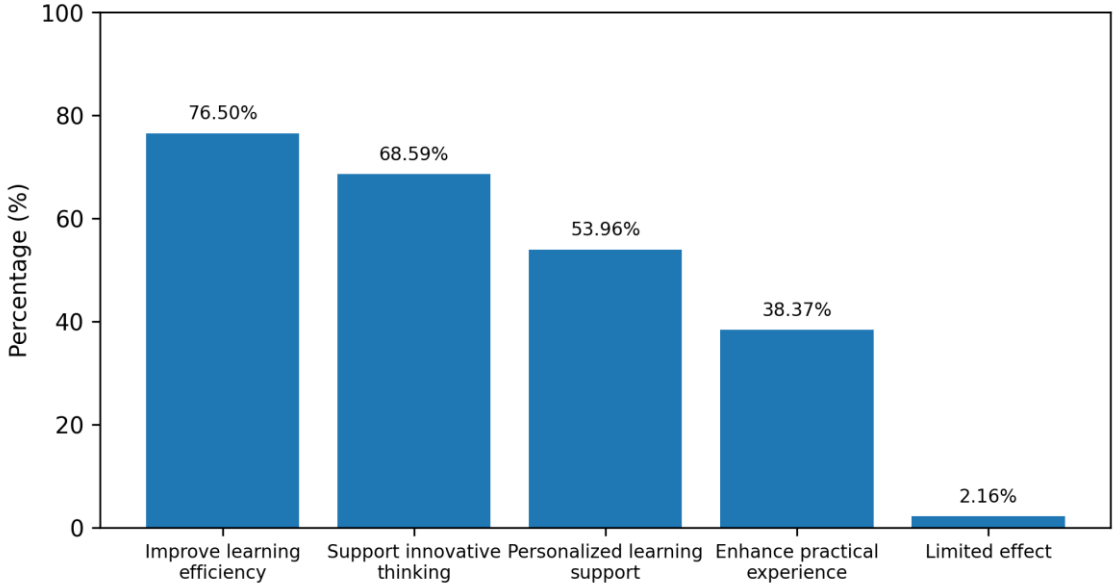


Figure 1. Students' Perceptions of the Value of AI.

These results indicate that students have substantial experience using AI, but their use remains concentrated in general-purpose tasks such as information retrieval, text generation, and after-class support. AI has not yet been fully extended to business-learning scenarios such as data analysis, business planning, and market simulation. This creates a coexistence of high usage and limited instructional integration: students know how to use AI, but it has not been sufficiently transformed into a teaching tool that supports business knowledge acquisition and practical skill development. Digital-intelligence reform should therefore go beyond increasing the number of AI tools and embed AI into course objectives, learning activities, practical tasks, and assessment.

2.4. Alignment of Course Objectives, Teaching Models, and Assessment Mechanisms

The survey showed that 61.87% of students wanted clearer course objectives and learning outcomes. Among this group, 73.51% expected clearly defined learning objectives and outcome assessment. These findings suggest that broad knowledge requirements should be translated into specific, observable, and assessable learning outcomes so that students understand what they should learn, the level of performance expected, and how their achievement will be assessed. This is consistent with the OBE principle of designing courses backward from intended learning outcomes.

Regarding teaching methods, 61.63% considered theory dull and insufficiently practical, while 26.86% felt that digital and intelligent content was limited. Meanwhile, 77.94% wanted theory to be integrated with practice, and 60.43% wanted courses to include AI and other digital-intelligence content. Theory, practical tasks, and digital tools should therefore be designed as an integrated whole rather than treating cases and AI tools as add-ons to conventional classroom teaching.

Assessment in existing courses may place excessive emphasis on final examinations that test knowledge recall and comprehension, with insufficient attention to changes in students' abilities, task performance, and integrated application during the learning process[2]. If assessment continues to focus primarily on memorization, intended outcomes such as data analysis, business planning, and innovative thinking cannot be adequately evaluated. A combination of formative, performance-

based, and summative assessment aligned with learning outcomes is therefore needed, supported by learning data to establish a cycle of continuous improvement.

3. A Reform Framework for OBE-Oriented, Digitally Enabled Business Courses

Based on the survey findings, this paper takes OBE as its guiding logic and digital-intelligence technologies as its support, developing a reform framework around three connected elements: objectives, teaching, and assessment. Learning outcomes define the direction of reform; the "three stages, seven steps, and one thread throughout" model restructures the teaching process; a "four-dimensional AI teaching scaffold" provides digital support; and data-driven assessment promotes continuous improvement.

3.1. Course Objectives Based on Learning Outcomes

OBE emphasizes "backward design and forward implementation": starting from industry needs and talent-development requirements, educators define the learning outcomes students should achieve and then determine course content, teaching activities, and assessment methods accordingly[3]. In response to the diverse disciplinary backgrounds and differing levels of prior knowledge among learners in university-wide business courses, the research team developed a course-objective framework.

The knowledge dimension comprises three elements: awareness of digital tools, understanding of business contexts, and basic risk awareness. These elements help non-business students develop a foundational understanding of business and digital technologies. The capability dimension comprises data-based communication, collaborative resource integration, and business-value innovation, cultivating students' ability to analyze problems, integrate resources, and create value through data-informed thinking and intelligent tools. The quality dimension comprises digital-intelligence thinking, technology for good, and responsible business literacy, fostering ethical awareness and a sense of responsibility in digital environments.

To operationalize these objectives, backward design follows the sequence "industry needs → graduation requirements → course objectives → learning tasks → assessment criteria." Industry research and interviews with enterprises can be used to identify regional industries' expectations for interdisciplinary talent and translate them into specific, observable, and assessable learning outcomes. For example, the course Brand and Marketing Management in the New Media Era could specify outcomes such as designing a brand communication plan with AI tools, interpreting user-behavior data in new-media marketing, and proposing responsible digital-marketing ethics recommendations.

3.2. The "Three Stages, Seven Steps, and One Thread Throughout" Teaching Model

Once course objectives have been clarified, the teaching process should be reorganized around the intended learning outcomes. The research team developed an intelligent teaching model consisting of three stages, seven steps, and one thread throughout. Learning is organized into pre-class, in-class, and post-class stages, with seven connected instructional steps.

The three stages are online self-study before class, AI-enabled practice during class, and intelligent extension after class. Before class, students watch micro-lectures and complete preparatory quizzes on a smart teaching platform to build foundational understanding. During class, they use AI to engage in scenario simulation, case analysis, and project discussion around authentic business problems, moving from conceptual understanding to practical application. After class, additional resources and practice tasks are recommended based on learning performance to support

differentiated learning. The seven steps are independent preparation, scenario introduction, foundational exploration, knowledge reinforcement, in-depth refinement, synthesis, and extension. Together, they form a learning cycle from knowledge acquisition to practical task completion and transfer. The "one thread throughout" integrates values education across the teaching process, embedding professional ethics, social responsibility, and technology for good into business cases, AI applications, and practical tasks[4].

To support this model, the research team further developed a four-dimensional AI teaching scaffold. First, cognitive support uses knowledge maps and concept visualization to make abstract business theories more concrete. Second, interaction support uses intelligent teaching assistants and immediate feedback to improve responsiveness. Third, tool support uses AI for data analysis, business modeling, and proposal generation, lowering the technical barriers that non-business students face in practical business tasks. Fourth, scenario support uses AI to simulate market competition, business operations, and marketing decisions, enabling students to transfer knowledge in task environments that approximate real-world conditions[5].

3.3. A Data-Driven Dynamic Assessment System

Assessment is essential to closing the loop in OBE-oriented course reform. The research team designed a mixed assessment system that combines formative and summative assessment and involves multiple evaluators. For formative assessment, a smart teaching platform collects learning data such as preparation completion, classroom participation, project-task performance, and group collaboration. These data help identify learning difficulties and weaknesses in instruction, provide teachers with a basis for adjusting their teaching, and deliver targeted feedback to students[6].

For summative assessment, the approach reduces reliance on examinations that primarily test knowledge recall and increases performance-based tasks built around authentic problems, such as business case-analysis reports, brand-marketing plans, and data-visualization outputs. These tasks focus on students' ability to apply business knowledge and digital-intelligence tools to practical problems. Assessment extends beyond teacher evaluation to include student self-assessment, peer assessment between groups, peer assessment within groups, and platform-based evaluation, thereby providing a more comprehensive picture of learning processes and outcomes.

Learning data can then support a closed loop of intelligent diagnosis, timely feedback, and continuous improvement. Teachers use the data to identify weaknesses and adjust content and teaching strategies; students use feedback to recognize strengths and gaps and revise their learning plans; and the course team uses periodic evidence to improve objectives, tasks, and assessment criteria. Assessment thus shifts from judging final results to supporting diagnosis, feedback, and improvement[7].

4. Conclusions

For university-wide business courses serving non-business majors, the central task is not simply to add more business knowledge or introduce more digital tools, but to reorganize course objectives, teaching activities, and assessment around students' learning outcomes. Based on 417 survey responses, this study found strong demand among non-business students for applicable business knowledge, identified the theory–practice gap as a major learning difficulty, and found that although AI tools are widely used in student learning, their deeper integration into business learning remains limited.

Accordingly, this paper uses OBE as its guiding logic to develop a three-dimensional, nine-element course-objective framework; restructures the teaching process through the "three stages, seven steps, and one thread throughout" model; uses a four-dimensional AI teaching scaffold to

transform AI from a general-purpose tool into instructional support; and establishes a data-driven assessment cycle for continuous improvement. This framework offers an actionable approach to reforming university-wide business courses in application-oriented universities. However, the present analysis is primarily based on survey data and the design of a teaching-reform framework. The effectiveness of the proposed approach should be further tested through subsequent teaching pilots, using evidence such as student learning outcomes, course satisfaction, and performance on practical tasks.

Acknowledgements

This work was supported by the General Project of the Teaching Reform Research Special Program of the Chongqing Education Science Planning Project, "Research on OBE-Oriented Teaching Reform of University-wide Business Courses in Application-Oriented Universities Enabled by Digital Intelligence" (Grant No. K25ZG2240215).

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