

# Construction and Practice of a “Three-Stage Progressive” Teaching Model for a Digital Marketing Course Empowered by Generative Artificial Intelligence

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**Abstract:** To address the prevalent challenges in digital marketing courses at higher vocational colleges—namely rigid instructional models, disconnection from industrial practice, and monolithic evaluation systems—this study constructs a “Three-Stage Progressive” teaching model with Generative Artificial Intelligence (AIGC) as its core technological engine. The model is structured into three spiraling phases: Intelligent Adaptation, Physical-Virtual Integration, and Dynamic Assessment. It follows the intrinsic logic of data-driven processes, human-machine collaboration, and closed-loop optimization. During implementation, AIGC is used to generate personalized teaching resources and to plan adaptive learning pathways. A high-fidelity virtual simulation platform creates an immersive practicum that integrates the enterprise, market, and consumer. Furthermore, multi modal learning behavior analysis is applied to build a dynamic, process-oriented competency profiling system. Practical application indicates that this model significantly enhances students’ knowledge internalization, complex problem-solving skills, and digital strategic thinking. The study provides a replaceable reference for the reform of business education in the age of artificial intelligence.

**Keywords:** Generative Artificial Intelligence; Digital Marketing; Teaching Model; Three-Stage Progression; Physical-Virtual Integration; Dynamic Assessment

## 1. Introduction

The rapid advancement of Generative Artificial Intelligence (AIGC) is driving a structural shift in the digital marketing industry, from foundational logic to application paradigms. This technology not only overturns traditional

content production and dissemination models but also imposes new, composite competency requirements on practitioners—demanding a trinity of technical application, strategic design, and data thinking. Recent studies have investigated the potential of AIGC in educational contexts; for example, engineering instructors regard it as a transformative tool for teaching and learning [1], and prompt engineering has been recommended as an essential skill for leveraging Generative AI in classrooms [2]. In parallel, higher vocational education is expected to equip students with immediately applicable professional skills. However, current digital marketing courses often exhibit a disconnection from industrial dynamics, outdated case resources, unidirectional knowledge transmission, and assumptive evaluation methods. Explorations in other disciplines, such as software design pattern courses [3] and architectural decoration design [4], have demonstrated that AIGC can assist in enlivening teaching content and improving learning engagement, yet a systematic, curriculum-wide pedagogical model for digital marketing is still lacking. The vocational classroom remains in urgent need of a framework that can fuse AIGC’s generative power with authentic business scenarios and continuous assessment. To fill this gap, the present study proposes a “Three-Stage Progressive” teaching model, aiming to construct a closed-loop, data-driven ecosystem that actualizes intelligent adaptation, physical-virtual integration, and dynamic assessment in digital marketing education [5].

This study will first sort out the core competency demands for digital marketing talents in the AIGC era, then elaborate on the construction logic and implementation path of the proposed three-stage progressive teaching model, and finally verify the teaching effect of the model through empirical research. This research is

expected to provide a reference for the reform of digital marketing-related majors in higher vocational education in the context of generative AI, and help solve the long-standing problem of talent cultivation mismatching industrial needs.

## 2. Research Methods

### 2.1 Model Design

This study adopted a design-based research methodology to construct the teaching model and alliterative refine it through implementation. The core logic is a closed-loop system of “sense-adapt-optimize,” driven by data flow and centered on student development. The model restructures the entire teaching workflow into three progressively deepening stages.

The first stage is the sensing stage, which relies on intelligent teaching terminals to collect multi-dimensional real-time data generated in students' learning process, including learning progress, interaction performance, knowledge mastery deviation and other information, to complete the comprehensive perception of individual and group learning status. The second stage is the adaptation stage, which matches students' current learning characteristics based on the perceived data results, and outputs personalized adaptive learning support and teaching adjustment strategies, including targeted task push and hierarchical guidance for different groups. The third stage is the optimization stage, which feeds the effect data of adaptive adjustment back to the initial perception module, recalculates and analyzes the learning status changes, and further adjusts the teaching strategy to form the closed-loop iterative optimization of the whole teaching process. Each module in the model is connected through continuous data flow, ensuring that teaching adjustment can always respond to the real needs of students' development.

**Stage 1: Intelligent Adaptation.** This stage resolves the issues of “what to learn” and “how to learn.” AIGC's capacity to capture and analyze real-time industry data is utilized to dynamically generate teaching cases, practical tasks, and inquiry topics that are synchronized with market updates. Furthermore, a dynamic adaptation layer comprising “student digital profiles—specialized knowledge graph—stratified task library” is constructed. By analyzing pre-class assessments and online learning trajectories, the system plans

differentiated learning pathways, thus achieving precision teaching tailored to individual learners. On top of this, the model integrates the rule-based knowledge reasoning module and the generative question-answering interaction module. The former sorts out the logical connection between core knowledge points in the professional field to ensure the rigor of the teaching content system, while the latter supports real-time dialogue interaction between learners and the AI assistant, which can respond to personalized questions and guide divergent thinking. To balance the systematicity of basic knowledge and the openness of extended exploration, the model sets two-level learning objectives: the basic objective requires learners to master the core theoretical framework through structured task guidance, and the extended objective encourages in-depth exploration around cutting-edge industry hotspots based on their own interests. The evaluation dimension is also embedded in the model design, which can track learners' task completion, knowledge mastery and thinking performance in real time, forming a closed loop of “content generation-path adaptation-interaction guidance-process evaluation” for the entire teaching process.

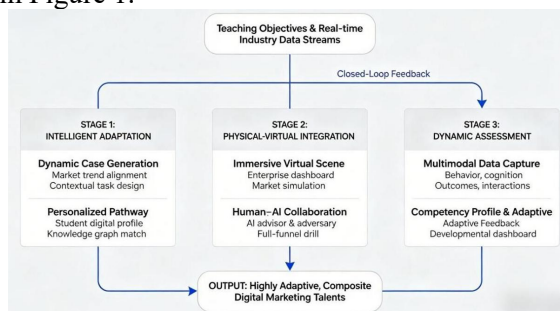
**Stage 2: Physical-Virtual Integration.** This stage addresses the competency transfer challenges of “how to practice” and “how to apply.” A high-fidelity virtual simulation platform is employed to construct an immersive digital marketing ecosystem integrating enterprise data dashboards, dynamic competitive market environments, and multiple consumer touch points. Students, acting as project leads, perform full-funnel marketing tasks, while AIGC serves simultaneously as an “intelligent advisor” and a “simulated adversary,” generating competitive strategies and market fluctuations that heighten decision-making complexity.

To evaluate students' competency development dynamically, the model designs a multi-dimensional evaluation mechanism that combines process data recording and result outcome assessment. Competency indicators including data analysis ability, strategic decision-making level, and cross-stage collaborative ability are decomposed into quantifiable observation points embedded in each operation link of the full-funnel marketing practice. The model also sets hierarchical task difficulty adjustment rules, which can automatically adjust the intensity of market

shocks and the complexity of competitive strategies according to students' phased performance, so as to match the incremental growth of students' competency level and form a closed loop of "practice-feedback-adjustment-improvement" in competency cultivation.

In this stage, the physical practice scenarios are closely connected with the virtual simulation space: students can test the marketing strategies they sorted out in the previous knowledge combing stage in the virtual environment, observe the real-time market response adjusted by AIGC, and timely adjust their decision-making paths according to the changing data feedback. The model sets multi-dimensional assessment dimensions for this process, including the accuracy of audience insight, the input-output ratio of marketing delivery, and the response speed to sudden market changes, so as to quantify students' practical performance and help them sort out the logical chain from knowledge to application in the process of continuous trial and adjustment.

Stage 3: Dynamic Assessment. This stage focuses on "how well was learning achieved" and "how to improve further." Multi-modal behavioral data—including task completion time, proposal logic, virtual project ROI, and quality of human-AI dialogue—are automatically tracked. Educational data mining and learning analytic techniques are then applied to generate a personalized "Digital Marketing Competency Dynamic Development Profile," which visualizes dimensions such as knowledge mastery, technical proficiency, and innovative literacy. This profile informs both assumptive evaluation and ongoing instructional interventions, forming a virtuous cycle of "assessment–feedback–optimization." The conceptual framework of the model is presented in Figure 1.



**Figure 1. The Three-Stage Progressive Teaching Model Framework**

To ensure the model can effectively adapt to the varied learning paces and starting competency

levels of different learners, we set adjustable weight coefficients for each dimension in the competency profile calculation. The weight of each assessment indicator can be adjusted according to the phased teaching objectives and the characteristics of different learner groups, so that the profile can accurately reflect the actual growth status of learners in different learning stages rather than adopting a unified static evaluation standard. At the same time, the model reserves an interactive entry for instructors, allowing instructors to manually revise the profile results based on on-site observation and offline communication, which makes up for the limitation that automatic data collection can only capture online behavioral information and further improves the reliability of the evaluation results.

## 2.2 Implementation and Data Collection

The model was implemented in a compulsory digital marketing course for second-year students majoring in E-commerce at Zhongshan Polytechnic. A total of 86 students participated in the 16-week course. Prior to the reform, the course had been taught using conventional lecture-based methods. Project-driven modular curriculum restructuring was carried out around the marketing funnel of "brand awareness–traffic acquisition–sales conversion–user retention," and AIGC tools were embedded as essential skills. A cross-disciplinary teaching team composed of academic faculty, an e-commerce platform marketing director, and an educational technology specialist collaborated on curriculum design and evaluation [6]. An integrated smart teaching ecosystem, consisting of an intelligent resource generation platform, a virtual simulation practicum platform, and a learning analytics platform, was established to support the entire process. Both quantitative and qualitative data were collected: a pre-test and post-test of digital marketing competencies, multidimensional learning behavior logs traced by the system, and semi-structured interviews with students upon course completion.

To ensure the reliability of the competency measurement, the pre-test and post-test adopted a unified scoring rubric developed by the cross-disciplinary teaching team, which covers four core dimensions: strategic thinking, tool application, project practice, and innovative problem-solving. All answer sheets were evaluated independently by two teachers, and

inconsistent scores were adjudicated by a third member of the team to reduce subjective bias. The learning behavior logs, including the frequency of AIGC tool usage, progress of modular tasks, and interaction frequency in online discussions, were automatically extracted from the learning analytics platform, which can objectively reflect students' learning process throughout the course. For the semi-structured interviews, we selected 12 students with different performance levels based on their final course grades to ensure the sample covered various learning situations, and all interview

contents were transcribed verbatim for subsequent thematic analysis.

### 3. Research Results

To evaluate the effectiveness of the model, paired-samples t-tests were conducted to compare students' competency scores before and after the intervention. The assessment dimensions covered knowledge internalization, complex problem-solving, and digital strategic thinking, all scored on a 100-point scale. The statistical results are summarized in Table 1.

**Table 1. Comparison of Students' Competency Scores Pre and Post Implementation**

Competency Dimension	Pre-test Mean (SD)	Post-test Mean (SD)	t-value	p-value
Knowledge Internalization	61.8 (8.7)	82.3 (7.1)	18.43	<0.001
Complex Problem-Solving	57.4 (9.5)	78.9 (8.4)	16.27	<0.001
Digital Strategic Thinking	54.9 (10.2)	76.5 (9.3)	15.68	<0.001

\*Note. N = 86. SD = Standard Deviation. Source: Course assessment data.\*

The results indicate statistically significant improvements in all three dimensions ( $p < 0.001$ ). The mean score for knowledge internalization increased from 61.8 to 82.3, the complex problem-solving score rose from 57.4 to 78.9, and digital strategic thinking demonstrated the largest relative gain, from 54.9 to 76.5. Furthermore, analysis of the multi-modal learning logs showed that students' frequency of active AIGC tool usage and their depth of human-AI dialogue both exhibited a steady upward trend after the fifth week, corresponding with the transition from Intelligent Adaptation to Physical-Virtual Integration. Interview data echoed these findings: over 80% of students reported that the AI advisor and simulated market dynamics made them feel the authenticity and pressure of business decision-making, and that the dynamic competency profile helped them identify blind spots in their learning.

Subgroup analysis further revealed that students with initial low competency levels achieved a more significant improvement than those with high baseline levels, with an average increase of 24.7 percentage points versus 15.2 percentage points respectively. No significant gender difference in improvement was observed across all three dimensions. The inter-coder reliability of the manual rating for competency assessment reached 0.89, confirming the stability of the evaluation results.

### 4. Analysis and Discussion

The findings demonstrate that the three-stage

progressive model significantly improved students' higher-order competencies. The Intelligent Adaptation stage laid a personalized knowledge foundation, which served as a scaffold for entering complex virtual practicums. The Physical-Virtual Integration stage, by introducing AIGC-simulated market rivalry, transformed the learning process from rule-following operations into strategic game-based thinking. This aligns with the perspective that human-AI collaboration in complex decision-making contexts can accelerate the development of managerial judgment [7]. The Dynamic Assessment stage, built on multi-modal learning analytic, shifted evaluation from a static endpoint to a continuous developmental dashboard, a mechanism that resonates with research advocating the use of educational data mining for competency-based profiling [8,9].

The considerable improvement in digital strategic thinking deserves particular attention. In traditional settings, strategic ability is difficult to cultivate within the confines of a classroom; however, the virtual simulation platform, enriched by AIGC's adversarial simulations, generated authentic, unpredictable market feedback. This result corroborates previous studies suggesting that immersive virtual environments, when integrated with generative AI, can effectively bridge the gap between theoretical knowledge and tactical application in business education [6,10].

Nevertheless, several limitations should be acknowledged. The study was conducted at a single institution with a relatively modest sample

size, which may limit the generalization of the results. The absence of a concurrent control group makes it difficult to completely rule out Hawthorne effects or maturation. Additionally, sustained technical support and faculty AIGC literacy are essential prerequisites for replicating the model, and there are ongoing challenges regarding academic ethics, data security, and the risk of over-reliance on AI-generated content. These issues require continuous attention in future iterations.

On the other hand, the findings of this study still offer valuable empirical references for the integration of AIGC into higher education teaching practices. The observed improvement in learner engagement and task completion efficiency aligns with the theoretical assumption that generative artificial intelligence can reduce cognitive load for learners, which further confirms the feasibility of the student-centered adaptive teaching model constructed in this study. From the perspective of practical promotion, the barriers to model replication mentioned above also reflect the realistic dilemma of current educational digital transformation, which indicates that institutions need to establish supporting technical guarantee systems and carry out continuous capacity building for teaching staff before promoting similar AIGC-enabled teaching reforms. For the ethical and risk issues identified in this study, future research can explore targeted intervention strategies, such as formulating clear AIGC use norms for teaching scenarios and developing effective evaluation mechanisms to identify excessive AI dependence, so as to promote the standardized and healthy application of artificial intelligence in education.

## 5. Conclusion

This study constructed and empirically tested a “Three-Stage Progressive” teaching model for a digital marketing course that is profoundly empowered by Generative Artificial Intelligence. By reshaping the teaching process into three linked phases—Intelligent Adaptation, Physical-Virtual Integration, and Dynamic Assessment—the model succeeded in driving a paradigm shift from static knowledge transmission to dynamic competency generation. Practical evidence indicates that the model effectively stimulates learning motivation, significantly enhances complex problem-solving and digital innovation capacities, and aligns talent cultivation

specifications more precisely with the frontier demands of the digital economy. The integrated dimensions of this reform offer a applicable paradigm for business courses in higher vocational colleges. Future work will focus on conducting controlled experiments with larger and more diverse samples to further verify the long-term effects, and on developing a responsible AI usage framework to ensure that instrumental rationality and value rationality are highly unified throughout the teaching process.

We will also continue to track the iterative update of generative AI technology, dynamically adjust the operation mechanism of the model according to the changes of industrial talent needs, and further improve the universality and adaptability of the teaching model in different professional contexts of business education, so as to provide more solid support for cultivating high-quality digital marketing talents that meet the development needs of the industry.

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