

Construction of a "Six-Dimensional Intelligent" Teaching System for Marketing Driven by Multimodal Digital Intelligence

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Abstract: Multimodal Digital Intelligence-driven Technologies are Altering the Form of Teaching in Marketing. A "six-dimensional intelligent" teaching system based on a multimodal large model is put forward here to present and convey all kinds of information intuitively in the area of marketing knowledge, such as text and pictures. The theory is the idea of multimodal representation and the structural correlation among the six dimensions and the technology-capability-value triple-cycle mechanism. Many platforms and content remodelling can be supported in the Design Stage, all kinds of collaboration and evaluation can be carried out, and useful technical tools can be added dynamically. At the level of operation, we will be able to give data-driven feedback and modify the content and form of self-regulation in transdisciplinary systems. Generative AI can be employed to construct virtual laboratories and intelligent assessment systems to help students better grasp abstract knowledge, reduce the time needed to update the curriculum in light of changes in the market, and provide personalised learning paths for all-round development.

Keywords: Multimodal Digital Intelligence-driven Marketing Teaching, Six-dimensional intelligent framework, Technology-Capability-Value triple circle, Transdisciplinary content restructuring

Introduction

In the past, there have been some problems with the teaching of marketing; it has been too theoretical and out of touch with actual marketing work, and only one way has been used to evaluate the results of students' learning. With the development of multimodal large models and other technologies for virtual simulations, generative AI and so on have reached a certain level; now it is possible to integrate multi-source data and build immersive, interactive environments to offer new solutions to the problems mentioned above. Although some specific technological applications have been achieved, many of the links in the above chain are still weak, and the all-encompassing reform efforts have not yet fully integrated technology, content, scenarios, evaluation, etc. Therefore, in order to improve the quality of education for marketing talents, we need to build a teaching system that incorporates all kinds of technology, organises cross-disciplinary content, adds progressive scenario-based training, and introduces dynamic evaluation and feedback. Based on the current technology of multimodal digital intelligence-driven methods, this paper proposes a "six-dimensional intelligent" teaching system and studies its theoretical basis, module structure, working mechanism, etc., to provide an application-oriented reference for teaching reform in marketing.

1. Theoretical Basis of the Multimodal Digital Intelligence-Driven Teaching System

1.1 Representation Logic of Marketing Knowledge in Multimodal Data Fusion

The usual way to present marketing knowledge in teaching now is multi-modal data fusion. Collect all kinds of data, such as text, pictures, sound, videos, etc., organise them in one place, and then present the abstract theoretical knowledge to the learners, such as consumer behaviour models and brand positioning strategies, in the form of visualisation graphs, dynamic simulations or interactive scenarios. The old way of presenting knowledge in traditional textbooks was linear and fixed; now, we have built a multi-dimensional and practical cognitive structure based on representations. Work with virtual brand ambassadors and use generative AI to obtain the latest market information, help students apply what they have learned in class to their daily lives, etc.

According to the theory of cognitive load, many ways of presenting abstract ideas can help students learn better. For example, a 3D dynamic knowledge graph can be used to show the competitive situation in the market intuitively, and all the relationships and changes among different brands do not need to be read from long texts. A virtual simulation system of live-streaming e-commerce can be employed to learn the terms "marketing funnel" and "conversion rate" in this way. The main reason for presenting the marketing knowledge in this way is to move from "telling" to "showing and doing" and improve the efficiency of learning and knowledge dissemination.

1.2 Core Elements and Structural Correlations of the Six-Dimensional Intelligent Framework

The six modules of the intelligent framework are Technology Promotion, Platform Construction, Content Organisation, Scenario Design, Project Evaluation and Value Orientation. The Modules are not in a line; rather, they form a network and work together. The general form of the tool matrix for generative AI, virtual simulation, AR/VR, etc., is a Technology Empowerment Module, and the platform construction module organises resources and distributes teaching materials in an online and offline teaching environment. The Content Restructuring Module organises the three main functions of marketing into general topics, basic problems and special themes to move away from the traditional division of disciplines in the curriculum. According to the progressive model of the "Eight Steps of Marketing", a Scenario Creation Module has been developed, and in conjunction with the four-level capability training system, virtual stores and enterprise practices have also been established^[1].

The Structure of the Modules is that of a bidirectional drive and feedback loop. With the help of technology, we can change the form of the content rapidly; for example, AI-generated case data can be directly used in the special themes of the curriculum. Learning behaviour data gathered during the construction phase of the course will be employed to customise the diagnosis in the project evaluation module, and according to this, adjustments will be made to the arrangement of technical tools. The Value-Guidance Module is not a standalone part; instead, it has been integrated into all the technical tools and many daily life situations, such as Chinese-style digital avatars used in professional activities to spread brand stories and cultural identity. The above structure will help the six features work well together and not be in isolation.

1.3 Interactive Mechanism of the Technology-Capability-Value Triple Cycle

The first two rounds will be about technology and application; the third will be different. The first round will be to lay the technological foundation: GPT will be used for text generation, Midjourney will be employed to create images, and VR technology will be directly applied to strengthen the three core marketing powers of learners, which are data analysis and judgment, strategic innovation and execution optimisation. Learners have begun to promote the marketing of their own works independently and have gained some experience in using new technologies by applying AI tools to various aspects of life. The second round will be to gather feedback on the functions of the technology; if learners do not believe that the current technical tools can solve a particular marketing problem, they will actively ask the teachers to add or develop new technical modules to promote technological iteration.

The third cycle will build the value guide, and then it will be used in all the following steps. At the same time, there will be ethical review and assessment of the brand value for the application of this technology; for example, when generating creative proposals with AI, commercial compliance and the social responsibility of the plan will also be checked. Training based on cases of Chinese-chic brands and local enterprise practice projects is often used to help learners better understand the culture of the local market. The three cycles do not need to be carried out in order; they can all be applied to different types of teaching activities. Organise a VR public relations training exercise to teach the staff about strategy communication and ethical business conduct at the same time. Through such interaction, technology, ability and value will be promoted to develop together, and the problem of using technology for the sake of technology will be avoided.

2. Module Design of the Intelligent Teaching System for Marketing

2.1 Dual-Track Support Strategy for the Multi-Platform Environment and Content Restructuring

All kinds of teaching activities can be carried out both online and offline at the same time. The

online end will be a cloud-based collaborative platform that integrates real enterprise marketing data, dynamic case libraries, personalised learning materials, etc., and at the same time, the offline part will build a closed-loop chain of "data circulation, task assignment, result submission and feedback diagnosis" in jointly built training spaces, virtual simulation laboratories and physical project links. A two-track system can be employed to have students conduct market research simulations in a virtual environment and obtain real consumer behaviour data via the Enterprise WeChat API interface at the same time, thus both theory and practice can be verified in a single class period^[2].

Therefore, the Form of Knowledge Organisation is changing now. The three main aims of the new curriculum are to have students collect and analyse data from their studies, use this data to solve problems in daily life and design products, and work with classmates in group activities. Python and Tableau are used for web scraping and consumer profiling; at the same time, generative AI has quickly produced many creative proposals in this field, and the concept of blockchain traceability has also been applied to address the problem of ethical brand communication. Do not add or delete any chapters; instead, according to the actual marketing tasks, group technical tools, industry cases and analysis methods to form callable knowledge modules. Approximately 30% of the content will be updated each semester according to changes in industry demand, and the knowledge system will be updated in line with the development of market technology.

2.2 Collaborative Operation of Multi-Scenario Drive and Multi-Project Evaluation

The Development of the "Eight Steps of Marketing" is based on many cases, such as all kinds of on-site demonstrations and simulated training, as well as real-project introductions; the four levels of capability training include virtual store drills, crisis public relations simulations, cross-border marketing decision-making and enterprise practice assessments. There are many kinds of technical support systems, and they are at various levels of intelligence; for instance, at Level 1, there is an interactive whiteboard and an intelligent assistant for the first stage of strategy design, and at Level 3, there are Metaverse virtual KOL collaboration simulations and AR real-scene store layout tools. A step-by-step scenario can be repeated several times, and if there are any errors, they will be minor; thus, learners can gain experience in dealing with all kinds of marketing problems and avoid costly mistakes in actual operation.

Gather the process data of all scenario-based tasks in the multi-project evaluation system. The three parts of the AI dynamic evaluation model are: voice sentiment analysis of the live-streaming script, records of the image generation for advertising creativity, and GMV and conversion rate data from simulated business data. The four divisions of the evaluation are: the AI system (40%), enterprise mentors (30%), course instructors (20%) and peer learners (10%), and the weights of these four items will be automatically adjusted according to the optimisation plan for the user. A prerequisite for cooperation is data interoperability; that is to say, the behaviour log data of the L1 virtual store can be directly used in the first stage of analysis for the L2 crisis public relations simulation, and the decision results of L3 can be taken as a reference for the L4 enterprise practice assessment. The Design will no longer be a single mark at the end of a task but will be formative feedback given at different times during the process.

2.3 Dynamic Integration of Technical Tool Embedding and Value Guidance

Technical Tools are not covered in the Design module, but they will be used in all marketing activities. Generative AI can be used in market research to have students enter the product information into ChatGPT or ERNIE Bot, and then, based on the actual data obtained by Python web scraping, modify the competitive analysis framework that has been generated by the AI. Digital human technology is used to realise the design of brand personification; that is, pictures, speech scripts and interaction logic for virtual spokespersons can be modified, and the system will promptly give feedback on the brand consistency score. AR/VR tools can be employed to place products and organise the layout of a store more easily, and at the same time, drag-and-drop operations are directly related to the theory of shelf display. The two can be combined, so we do not need to take an extra class on the application of artificial intelligence tools^[3].

Guidance for values is indirectly expressed in the links of technical operation. Chinese-style digital avatars can be employed to tell the story of the development of China-chic brands, and learners can be taught how to extract and adapt local cultural symbols in their own designs for virtual spokesperson images. A problem has been found in the creation of AI-generated live-streaming scripts to help farmers

in rural areas earn money online, and students should be aware of the long-term impact of this plan on the local supply chain. With the help of some technology, many simple and effective ways have been developed to make value judgments; for example, when an AI creates a creative plan, a pop-up window will appear to ask if there are any problems with biased data or cultural appropriation. Together, the two do not overlook values in professional teaching, so problems such as business ethics and cultural identity are naturally covered in the technical work and are not taught separately.

3. Operational Logic and Iterative Path of the Teaching System

3.1 Multiple-Source Data-driven Teaching Feedback and Regulation Process

All the data collected from all over during the teaching will be used to improve the feedback. Operation records how often learners use the Boardmix collaborative whiteboard, how often nodes in the NRD Studio knowledge graph are clicked, which decision path options are chosen in the virtual simulation system, and what speech sentiment curves are collected by the AI assessment system are all examples of heterogeneous data that are uniformly collected and integrated into the teaching data platform. Organize and harmonise the raw logs in the teaching data platform, then extract feature variables related to the three main marketing functions (e.g., the completion time and error type of consumer profiling tasks, response speed and number of strategy adjustments in crisis public relations simulations, etc.). All kinds of feature variables are fixed indices for capability observation, and together they make up an observable state of teaching.

The way regulation is done is closed-loop. If the system finds that the mean score of a class in the "strategic innovation and creative expression" dimension is below the upper limit, it will automatically trigger the content push module to offer that class a library of AI-generated case studies on China-chic cross-border marketing and optimisation of AR omnichannel touchpoints. At the same time, the teacher will also be given a visual diagnostic report that shows that the main problem is a low brand consistency score for the brand personification design. The two ways to issue the regulation instructions are as follows: First, the system will automatically adjust the difficulty coefficient of the scenario task in the next stage; second, it will put forward a particular classroom intervention measure for the teacher, such as adding an operational demonstration of the digital human IP incubation experiment. Based on the above data, changes in teaching are now based on facts rather than emotions, and the time to make adjustments has been reduced to about 24 hours after a single class^[4].

3.2 Knowledge Update Plan for Restructuring Transdisciplinary Content

The main content of transdisciplinary construction is to break away from the chapter division of traditional marketing courses based on functional modules. Based on the actual marketing tasks, all kinds of knowledge from all over can be gathered and organised according to the demands of the tasks, such as consumer behaviour, data analysis, brand building, communication studies, information technology, etc. For instance, in the topic "Design of Social Media Viral Communication Strategies for a China-Chic Brand", we can learn about incentive mechanisms for user-generated content from communication studies, how to carry out public opinion sentiment analysis based on data analytics, how to extract local cultural symbols in brand management, and the logic of metaverse virtual KOL interaction from information technology. Restructuring is based on the order in which the knowledge is needed to solve problems, not on the division of disciplines, so learners do not have to switch among different areas of knowledge^[5].

The new knowledge will be in line with the changes in the industry. Periodically collect the technical keywords from the marketing job postings of the enterprise data interface of the main recruitment website, combine them with the changes in category hot terms obtained from the Tmall Consumer Insight API, and generate weight adjustment signals for nodes in the knowledge graph. If the frequency of the terms "private domain traffic operation", "AI creative generation" and "short-video conversion attribution" in industry discussions is high, then automatically increase the recommendation weight of the corresponding knowledge modules and add new enterprise practice cases (such as the whole process of integrating a brand's Enterprise WeChat API data) to the teaching resource library. About 30 per cent of the teaching materials need to be updated or added every semester, and the new content should pass the "three-in-one" adaptability test: the technical toolkit (Python/Tableau), the industry case library (China-chic cross-border/virtual KOL), and the ethical deliberation area (AI ethics review). Therefore, the time lag between the course content and the development of market technology

will be limited to three months, and the update frequency of traditional textbooks is generally 12-18 months.

3.3 Method of Self-Regulation for Marketing Capability Development

The first type of self-regulation in the system is to observe one's own development. All new students will take a general ability test at the beginning of the class to gauge their skills in using data tools, knowledge of marketing theory, and the combination of creativity and logic. Finish all the scenario tasks, and then the AI dynamic evaluation system will generate a capability increase report and show the change in the slope of the three growth curves for "data-driven market analysis and judgment capability", "strategic innovation and creative expression capability", and "technology-empowered execution optimisation capability" as line charts. If there are two consecutive plateaus in a particular curve, it can be concluded that the current training intensity or type of content is not suitable for the learner's ability level, and thus the regulation mechanism will be triggered^[6].

Concrete operations of self-regulation include changing the difficulty of a task and changing how to obtain resources. Students who achieve a good score in Level 3 of the "Cross-Border Marketing Decision-Making" test will be allowed to take the Level 4 enterprise practice test early and will need to repeat fewer times for the lower-level tasks. For learners who are still making mistakes in the sentiment analysis of the "Brand Asset Evaluation" task, the dimensions of sentiment annotation for AI public opinion data will be broken down into more specific practice modules, such as recognition of emotion polarity, grading of intensity, filtering of sarcastic tone, etc., and each will have 3-5 micro-training cases. According to the general distribution map of students' abilities, teachers can find skill nodes that are relatively weak among the students in a particular class; for example, "user segmentation strategy in private domain traffic operation" may be an advanced topic for most students, and in such cases, additional hands-on exercises can be organized for the whole class based on Enterprise WeChat API data. The whole self-regulation process does not need to be done manually; preset rule engines and lightweight machine learning models can handle it automatically, and the teaching system will continuously adjust its own parameter settings according to the performance of the group of learners.

Conclusion

Develop a "Six-Dimensional Intelligent" Teaching System for Marketing based on Multimodal Digital Intelligence in this paper. The previous theoretical work has put forward a model for the representation of multimodal data fusion, shown the structural correlations among the six dimensions, and explained the interactive mechanism of technology, capability and value. The first two tracks have met the demands of many platforms and content companies, cooperation has been achieved at all levels, evaluations have been conducted, and dynamic integration of technology and values has also been realised. According to the operating data, feedback control is applied to modify the knowledge of transdisciplinarity and system self-regulation. Integrate all kinds of technologies, such as generative AI, virtual simulation, AR/VR, etc., into all links of the marketing activities to create progressive scenario-based training, and use a multi-subject evaluation model to close the loop and optimize the delivery mode of knowledge, learning path and ability feedback. In the future, the two directions we will go are as follows: First, we will build an alignment method for the capability observation indicators in the teaching system with industry talent standards to improve the external validity of learners' capability profiles; second, automatic extraction and modelling of implicit features in multimodal teaching data (such as patterns of collaboration and strategies for creative divergence) will be carried out to increase the precision of personalised regulation. We will keep expanding the number of channels for cross-institutional and cross-disciplinary transfer and adaptation.

Fund Projects

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