

Research Report on the Construction Path and Model of AI+ Curriculum Practical Teaching in Application-Oriented Universities under the Background of New Liberal Arts—Taking the Construction of Computer Fundamentals and Artificial Intelligence General Education Courses as an Example

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ABSTRACT

In the context of high-quality development in the tourism industry, it is essential to deepen supply-side structural reform, promote the development of smart tourism and the integration of "tourism+" and "+tourism," and improve the modern tourism system characterized by high efficiency and strong driving capacity. The emergence of a new development pattern has created broad opportunities for technological innovation within the tourism sector, highlighting the core role of science and technology in transforming tourism production, services, and governance. In response, the cultivation of compound talents in "tourism + science and technology" with strong practical and innovative capabilities has become a national priority. To meet this demand, relevant policies encourage higher education institutions and enterprises to jointly develop practical, interdisciplinary training programs, particularly in cultural and tourism technologies. Meanwhile, the reform of China's higher education has introduced new educational paradigms, including the "new liberal arts," which emphasizes the cultivation of talents with global vision, interdisciplinary skills, innovation capacity, and critical thinking. Under this background, the construction of practical teaching content for fundamental computer courses in application-oriented universities plays a crucial role in bridging basic education, professional training, and employment readiness. However, current curricula often face issues such as outdated content, rigid teaching methods, and weak integration of theory and practice, leading to limited alignment with industry demands. This research focuses on application-oriented universities in Beijing, using the design and implementation of practical curriculum systems for freshmen as a case study. It aims to analyze existing challenges and propose reform strategies to improve curriculum relevance, teaching quality, and practical effectiveness, thereby supporting the cultivation of high-quality, application-oriented talents in the digital and intelligent era of tourism development.

KEYWORDS

tourism industry; supply-side reform; smart tourism; tourism + technology; practical talent cultivation; application-oriented universities

1 Construction Goals

By dismantling already implemented projects and starting from the processes of project idea proposal, project demand analysis, plan formulation, team formation, development and construction, trial operation, implementation, management and operation, and innovation, students will be comprehensively guided to learn the project development process and operational methods. They will transform and apply the basic skills and professional knowledge learned previously. For example, how engineering courses that combine computer science and tourism are applied in projects and how the professional knowledge of tourism courses plays a role in actual production will be taught. On this basis, students will be inspired to think and innovate based on projects.

2 Curriculum Construction Direction

The state will focus on improving the modern tourism system, deepening the supply-side structural reform of the tourism industry, advancing the construction of smart tourism and "tourism+" and "+tourism,"^[5] providing more high-quality tourism products and services, strengthening the integration of regional tourism brands and services, and achieving high-quality development of the tourism industry. The state's development orientation for the tourism industry has put forward new requirements for the supply of tourism talents. Cultivating "tourism + science and technology" compound talents with strong practical abilities has gradually become a new trend.^[6] Therefore, it is necessary to open tourism innovation and entrepreneurship practice courses that integrate practical application scenarios and inspire students' innovative thinking based on the talent demand for tourism development.

The construction of the practical modules of the curriculum will form a system with the basic and professional courses of the Tourism College. Taking tourism digitization as the entry point, students will be guided to apply the knowledge they have learned to cutting-edge practical application scenarios in the tourism industry^[7]. Through the analysis of application cases, modular teaching will be achieved. Students will be guided to complete case replication and inspired to

conduct innovative explorations based on case applications, forming "tourism + science and technology" application innovation achievements oriented towards the digitization frontiers of the tourism industry.

The course content will integrate professional education, innovation and entrepreneurship education, and comprehensive ideological and political education, cultivating students' innovative spirit, entrepreneurial awareness, and ability to solve practical problems through classroom teaching, scientific research training, project/activity implementation, and competition guidance. The course content will determine typical application scenarios from various aspects of tourism, such as food, accommodation, transportation, travel, shopping, and entertainment, and conduct multi-angle analysis and practice targeting the cutting-edge applications of the tourism industry. During the teaching of these scenarios, the background, content information, involved theories, and digital technologies of relevant cases will be described to enable students to understand the scenarios and their benefits. After recognition, understanding, and integration, students will conduct practical innovations to strengthen the cultivation of innovative abilities and highlight practical effects. A new model of practical teaching integrating tourism and digital technologies will be realized, and a teaching platform will be gradually established in the process.

3 Practical Course Resource Points and Module Construction

The proposed teaching modules and practical cases include but are not limited to :

- Online review data analysis for hotels, scenic spots, and catering
- Tourist flow forecasting and early warning for tourist attractions
- Visual analysis of entertainment activities
- Online live streaming and broadcasting of conferences and exhibitions
- Precision marketing and promotion of travel agencies and scenic spots based on short videos and cloud live streaming

Three scenarios and modules are initially designed, with other application scenarios to be further improved and supplemented.

3.1 Analysis of Online Review Data for Hotel Guest Feedback (also applicable to scenic spots and catering online review data)

Analyzing the feedback data of tourists from cultural tourism destinations such as hotels and scenic spots can mine valuable information such as tourists' concerns, opinions, suggestions, and emotional tendencies. For hotels, under severe competitive challenges, analyzing online review data to grasp customer satisfaction and preferences is of great significance for improving service quality and management and marketing strategies. Taking this as the background, based on data analysis (basic applications of Excel and Python), students will complete online data crawling and data analysis for hotels, scenic spots, etc. in the form of projects. This will enable students to understand industry needs during the practical process and enhance their ability to solve practical industry problems using digital means.

Through the total data volume of nine types of information sources (news, forums, post bars, blogs, microblogs, Q&A, videos, WeChat, and OTA), the proportion of information sources, the ranking of information sources, and emotional analysis, internet content big data will be comprehensively interpreted.

Resource Point 1: Overall Analysis Case

The selected time and region, the total data volume of the nine major information sources, and the month-on-month change.

The data will change with the currently selected information source type.

The region supports multiple selections and statistics by day/month/year granularity.

Resource Point 2: Information Source Analysis Case

Information source trend: The data volume trend of the nine types of information sources in the selected time and region. Clicking on the trend line can quickly locate the list page.

Information source proportion: The data volume proportion of the nine types of information sources in the selected time and region. Clicking on the ring chart can quickly locate the list page.

Resource Point 3: Emotional Analysis Case

Emotional trend: The data volume trend of positive, neutral, and negative emotions in the selected time and region, which can be drilled down to the list page.

Emotional proportion: The data volume proportion of positive, neutral, and negative emotions in the selected time and region, which can be drilled down to the list page.

Other analyses:

Hot topics: High-frequency hot words mentioned in internet data in the selected time and region.

Top 10 data sources: The top 10 media in terms of data volume in the selected time and region, which can be drilled down to the list page.

Latest data: The 10 most recently published pieces of data in the selected time and region, which can be drilled down to the list page.

Resource Point 4: Other Analyses

Information source proportion: The data volume proportion of the nine types of information sources in the selected time and region, which can be downloaded to view the media proportion of each information source. After drilling down, the data of ②③④⑤ will change accordingly. Students can click "Chart Reset" to return to the information source proportion.

Risk index: The public opinion risk index in the selected time and region. A higher index indicates a higher public opinion risk.

Data trend: The trend of public opinion data volume and public opinion risk degree in the selected time and region, which can be downloaded to the list page.

Emotional proportion: The proportion of positive, neutral, and negative emotions in the selected time and region, which can be downloaded to the list page.

Hot topics: High-frequency hot words mentioned in internet data in the selected time and region.

Media article distribution: The regional ranking and heat distribution of media article volume in the selected time and region.

List: Click to switch to the data list. After entering the list page, click "Dashboard" to return to the dashboard display.

Count the number of new unread messages. Click to enter the list page to view unread information.

The region supports multiple selections.

The data collected in this case can display article details, including the following features:

Positive/negative degree: Positive degree + negative degree = 100%. Articles with a negative degree < 20% have a positive emotional tendency, articles with 20% < negative degree < 80% have a neutral emotional tendency, and articles with a negative degree > 80% have a negative emotional tendency.

Propagation volume: The number of articles with the same title is the propagation volume of this article.

Propagation power: Calculated by weighting the article propagation volume according to the publishing media's weight.

Original link: Click "Original Link" to access the original article through a browser.

Main text content: The main text content does not include pictures or videos in the original article.

3.2 Analysis of Short Video Production, Playback, and Other Propagation-Related Data for Travel Agencies, Scenic Spots, etc.

In the case of short video production, playback, and data analysis for travel agencies, scenic spots, etc., data mining (crawling and analysis) of the (platform for content placement) is first conducted. Then, combined with relevant marketing and communication theories, short videos are designed, produced, and placed in a targeted manner. Subsequently, based on the data, improvements are made and re-placed to achieve better results, helping travel agencies, scenic spots, etc., to conduct more effective short video production and formulate more optimized platform selection strategies. During the process, students can experience the entire process of data collection and analysis on the platform and establish connections with the computer fundamentals and a small amount of Python basics they have learned, associating the learned theories with industrial practice applications.

3.3 Tourist Flow Forecasting and Early Warning for Tourist Attractions

Based on data analysis as the technical foundation and combined with historical data analysis of tourist attractions, quarterly tourist flow forecasting is conducted. Students are guided to transform the theoretical knowledge (such as Python data analysis) learned in computer fundamentals courses into practical abilities to analyze tourist access data of scenic spots and establish forecasting models. They will understand the laws of tourist access to key scenic spots, master analysis methods, and replicate real application cases. At the same time, they will learn to establish a visualization big data platform for tourist flow early warning in tourist attractions. The establishment of the platform, the replication effect of forecasting cases, and the innovation of forecasting and early warning schemes will be used as evaluation indicators for the learning effect of this module.

Resource Point 10: Real-time Tourist Flow Monitoring Case Real-time monitoring of tourist density, distribution, and trends within scenic spots, comparing tourist distribution at different time periods.

· **Trend chart:** Compares the real-time tourist flow changes of the same electronic fence on the same day.

- Heat map: Compares the real-time tourist distribution of the same electronic fence on the same day. The tourist flow trend includes real-time monitoring of the tourist flow trend changes of the electronic fence and the possible impact of weather and events on the tourist flow of the day. The real-time carrying capacity and daily carrying capacity can be dynamically adjusted to facilitate dynamic and scientific early warning based on the tourist situation in the scenic spot. The heat distribution includes presenting the real-time distribution status of tourists in the electronic fence on the map, dynamically analyzing the distribution of tourist volume in hot and cold spots, and helping management personnel guide and divert tourists.

Resource Point 11: Historical Tourist Flow Analysis Case Combined with information such as weather, holidays, and events, multi-dimensional analysis of historical tourist flow data is conducted through time/day/week/month tourist flow granularity and time dimensions to provide decision support for the refined management and contingency plan preparation of scenic spots.

- Overall tourist flow: The total number of people who have reported their presence within the electronic fence monitored over a period of time.

- Tourist flow from the same district/county/city/province: People whose place of residence is in the same district/county/city/province but do not work or live within the electronic fence.

- Tourist flow from other districts/counties/cities/provinces: People whose place of residence is in other districts/counties/cities/provinces. The tourist flow trend analysis module includes comparing the tourist flow changes in the same time period or multiple time periods and comparing the tourist flow changes in different regions over multiple time periods. Multi-dimensional analysis of tourist flow changes can be conducted through influencing factors such as weather, weekdays, holidays, and events. Statistical analysis can be provided through various dimensions such as hours/days/weeks/months/years, and tourist flow trend reports can be exported. The number of changes in tourists within the electronic fence can be statistically analyzed through various de-duplication methods such as hourly/daily/weekly/monthly. The historical tourist flow distribution analysis module includes comparing and analyzing the tourist arrival and source distribution and stay trends over a period of time through heat maps and POI (Point of Interest) information points. The arrival distribution heat map can conduct real-time monitoring and comparative analysis of tourist arrival situations and display tourists' arrival and stay preferences.

Resource Point 12: Tourist Behavior Portrait Case Based on external tourism data, a tourist portrait data in the cultural and tourism scenario is constructed, including tourists' gender, age, travel preferences, APP usage preferences, consumption preferences, etc., to accurately locate tourist attributes, thereby helping destinations (tap potential customers) and assisting regions/scenic spots in creating marketing closed loops. Tourist basic portraits:

- Basic tourist portraits: Gender, age, education level, occupation type, marital status, mobile phone operator, etc.
- Tourist consumption potential: Consumption freedom, consumption grade, price of the residential community, vehicle brand, etc.

4 Innovation in Practical Teaching Models

The tourism practical teaching center realizes a twin social practice teaching ecosystem for students in the Tourism College, enabling them to achieve work practice, experience social operation, and enterprise operation on campus, and put what they have learned and thought into practice. It can create an on-campus market, conduct full-scale actual online operation, and offline negotiation and interaction.

Project Name: Twin Social Practice Teaching Ecosystem

Project Target Audience: Teachers, sophomores and above-year undergraduate students, graduate students, and doctoral students.

Organizational Structure: The Twin Social Management Committee, with different management institutions established under it. According to different industries, different industry service committees are established with different service functions. Management authority ultimately belongs to the Social Management Committee. The Social Management Committee establishes directly managed enterprises according to specific practice needs to provide students with practical work positions. The relevant directly managed enterprises should truly be able to serve the school and society, have a workload and significance, and bring relevant benefits. They can choose to access existing services of the school and society, contact existing enterprises, and be incorporated into the management and support of the Social Management Committee.

For internal service enterprises of the school, students can be responsible for operation and management, with teachers for supervision. For external service enterprises of society, a teacher management and student operation model can be adopted, with a supervision committee established at the same time.

Necessity and Feasibility Discussion: Tourism management, exhibition economy, catering, etc., all require practical teaching. At present, each department has its own practical teaching locations and methods. It is inconvenient for the

practical teaching center to aggregate them, and the independent practical teaching methods with their own characteristics of each department will still be retained. At the same time, the construction of twin society is a kind of on-campus social practice established on the basis of practical teaching.

The problems to be solved are: On the one hand, through early practical teaching and on-campus work practice, students can come into contact with the application methods of what they have learned in advance. On the other hand, through the joint construction of the on-campus society and off-campus enterprises, targeted talent cultivation and early career planning can be achieved. The overall practical teaching will be made into a society, operated reasonably, and relevant institutions will be established to achieve a realistic simulation and the twin construction of the on-campus society.

In the later stage, relevant capital will be introduced into the construction of the on-campus society twin and other industrial clusters. The cooperation mode between the school and enterprises in terms of industry-university-research-application integration will be enhanced, and a seamless transition between students and employees will be realized.

The main operating institution is the practical teaching center, which serves as the government of the twin society, reasonably allocating and adjusting the overall market and deploying resources.

The main operating industries will create basic industries, starting with the tourism major and later diverging to all colleges and majors in the school, gathering as many industries as possible. As it reaches the school level, the relevant government system should also become more complex. The practical teaching centers under the leadership of the school-level practical teaching center will realize the management and operation of each college as a sub-level government.

Each twin government invests funds to establish original enterprises as the development foundation and recruits employees for internships and work. On this basis, all personnel on campus can also attempt entrepreneurship, meet financing needs through monthly roadshows, and start their own businesses to enrich the industrial direction.

An industrial park or industrial area will be established on campus for students to work during practical sessions. A co-working model similar to WeWork can be adopted for joint office work.

This project aims to cultivate and control the practical abilities of students in application-oriented colleges and universities. At the same time, it provides students with a certain degree of stimulation and experience from the twin society (including governments, enterprises, etc.) in advance, preventing students from being left behind for too long and thus losing control of their development paths when they enter society.

5 Conclusion

This curriculum initiative outlines a forward-looking, practice-oriented, and innovation-driven teaching framework aimed at cultivating interdisciplinary talents for the digital transformation of the tourism industry. Grounded in national tourism development strategies and digital technology integration, it emphasizes practical scenario-based learning, data-driven analysis, and project-based innovation. By combining foundational skills in computer science and tourism with real-world case studies—such as online review analysis, short video marketing, and tourist flow forecasting—students are equipped to address industry challenges with technological solutions. The construction of a “Twin Social Practice Teaching Ecosystem” further strengthens experiential learning by simulating real-world enterprise environments on campus and fostering industry-university integration. Ultimately, the program supports the development of compound tourism-tech talents who can drive high-quality, data-informed, and innovative growth in the tourism sector.

Funding

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