Multi-dimensional Teaching Model Reform: A Case Study of Quantitative Analysis in Management Courses under 'Internet+' and Curriculum Ideological and Political Education

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Abstract: *With the penetration of "Internet+" into the education field, students' learning environment has evolved from a multimedia environment to a digital learning environment, with learning time and space continuously expanding and developing. Based on the educational concept of "Internet+ Curriculum Ideological and Political Education" and leveraging the empowering role of internet platforms, a multi-dimensional teaching model of "theory-practice-value" has been constructed in accordance with the training objectives of the "Quantitative Analysis for Management" course. This model follows the mechanism path of "mastering management quantitative theory—developing quantitative data skills—realizing curriculum ideological and political value". The model integrates curriculum ideological and political education into theoretical teaching and social practice. Through organizational empowerment, structural empowerment, and field empowerment, it cultivates students' abilities to analyze data and build models. This approach facilitates students' transformation from acquiring management knowledge to developing management skills, and ultimately to attaining comprehensive management capabilities. This innovative teaching model holds significant implications not only for the development of public administration as a discipline in the Chinese context but also for enhancing the quality of education for public administration majors.*

Keywords: Internet+ Curriculum Ideological and Political Education; Multi-dimensional Teaching Model; Teaching Model Reform; Quantitative Analysis for Management

1. Literature Review and Problem Statement

On May 28, 2020, the Ministry of Education of China issued the "Guiding Outline for the Construction of Ideological and Political Education in Curriculum in Higher Education Institutions". This document emphasized the importance of innovating classroom teaching models to promote the application of modern information technology in ideological and political education within curricula. The primary objectives are to stimulate students' enthusiasm for learning and guide them towards more profound critical thinking [1].

With the integration of "Internet+" into education, students' learning environments have evolved from traditional multimedia settings to comprehensive digital learning spaces, with learning time and space continually expanding. Current research indicates that students' individual behaviors during the learning process provide crucial data for obtaining detailed information on their learning status. These behavioral patterns are incorporated into teaching model systems as analytical factors. Based on this data, student models are established, and learning abilities are evaluated to further develop precise, tailored teaching methodologies [2]. In implementing these teaching processes, educators fully utilize both detailed student learning information and relevant "Internet+" resources to address individual differences among students effectively [3].

"Internet+" is an innovative information technology system that, centered on the Internet, spans social, economic, life, and educational domains, fostering the creation of new products and services[4]. Incorporating "Internet+" elements into higher education not only enhances the scale and quality of education but also revitalizes professional development, quality education, and ideological and political

education in universities. This approach demonstrates key characteristics of networking, intelligence, personalization, and globalization.

In the context of "Ideological and Political Education in Curriculum", it is crucial to explore and integrate elements of ideological and political education embedded within various disciplines. Courses should be strategically structured to cultivate students' comprehensive development, emphasizing teaching reform and optimization. The focus should be on seamlessly integrating professional education, quality education, and other content with ideological and political education to achieve a new framework of comprehensive and all-round education. The concept of "Internet+ Ideological and Political Education in Curriculum" leverages the complementary advantages of multiple teaching spaces, allowing ideological and political education to permeate all aspects of the learning experience [5].

"Quantitative Analysis for Management" stands as a core discipline within the Public Affairs Management major. Its theoretical framework is extensive and multifaceted, intersecting with multiple disciplines. This subject is characterized by strong practical applicability, requires advanced software operation skills, and is subject to rapid knowledge updates [6]. In the era of big data, strengthening students' quantitative analysis abilities and cultivating talents with abstract thinking, practical skills, data processing capabilities, and innovative mindsets has become a critical consideration in undergraduate education for Public Affairs Management. This challenge presents an opportunity to reshape the curriculum to meet the evolving demands of the field and prepare students for the complexities of modern public management.

At the theoretical foundation level, the Quantitative Analysis for Management course provides students with a comprehensive grounding in mathematics, statistics, and computer science. This robust foundation enables students to comprehend and apply sophisticated quantitative analysis methods to address complex public management challenges. The curriculum encompasses advanced theoretical knowledge in probability theory, mathematical statistics, operations research, and game theory. Additionally, students master cutting-edge techniques for data collection, processing, and analysis, complemented by skills in model construction and strategic decision-making.

On the practical skill level, the course is designed to cultivate students' proficiency in data handling, analysis, model building, and decision-making. These skills are crucial in empowering students to effectively utilize data in support of evidence-based public policy formulation and management decisions [7]. The curriculum incorporates hands-on training in the use of advanced statistical software for data processing and analysis. Students learn to construct sophisticated mathematical models to simulate complex public management scenarios and apply these models in nuanced decision analysis.

In terms of value education, the course employs a rich array of case studies and interactive discussions to foster scientific thinking methods and instill core values among students. A primary aim is to cultivate a deep sense of social responsibility and public service awareness. Students are guided to apply quantitative analysis methods to real-world public management challenges, use data-driven approaches to identify and solve societal problems, and consistently prioritize public interests in their decision-making processes .

However, in the current big data era, the Quantitative Analysis for Management course faces unprecedented challenges. Students must not only master comprehensive theoretical knowledge and advanced practical skills but also internalize the ideological and political values conveyed by the course to adapt to the increasingly complex and rapidly evolving social environment. The emergence of Internet+ education offers an innovative approach to address these multifaceted challenges. By leveraging cutting-edge Internet platforms, it becomes possible to create a highly flexible, interactive, and efficient learning environment. This approach aims to stimulate students' enthusiasm for learning, enhance their interdisciplinary capabilities, guide them in establishing robust ethical frameworks, and lay the groundwork for precise, personalized teaching reform.

In conclusion, considering the transformative impact of "Internet + Education" on the educational landscape, and building upon the precise teaching model in the "Internet+" context and the progressive educational concept of "Internet+ Curriculum Ideological and Political Education", this research proposes constructing an innovative "Internet+" empowered framework. This framework integrates "Theory + Practice + Curriculum Ideological and Political Education" in a seamless manner. The multidimensional reconstruction of the "Quantitative Analysis for Management" course, empowered by the synergy of "Internet + Curriculum Ideological and Political Education + Practical Investigation", plays a pivotal role in promoting the in-depth development of public management disciplines within China's unique socio-political context. Moreover, this approach significantly enhances the educational quality of public management programs, equipping graduates with the advanced skills, ethical grounding, and

analytical capabilities necessary to excel in an increasingly competitive and complex job market.

2. Current Challenges in Teaching Model Reform in the "Internet+" Era

The rapid advancement of Internet technology has introduced innovative perspectives and tools to management education. However, it has also exposed significant incompatibilities within the existing teaching system. These issues not only impede students' mastery and application of management quantitative analysis skills but also hinder the overall improvement of course teaching quality. Therefore, identifying and analyzing these problems and their root causes is crucial for reforming and optimizing the Quantitative Analysis for Management course. The current challenges in teaching model reform in the "Internet+" context are primarily manifested in three critical aspects:

Firstly, outdated teaching methods fail to integrate deeply with the characteristics of students in the digital era and the Internet, resulting in insufficient learning motivation. Traditional classroom teaching, which is predominantly teacher-centered and relies on unidirectional knowledge transfer, has become obsolete in the face of modern educational needs. This approach fails to respect students' agency and ignores their desire for interactive and practical learning experiences in the contemporary context. In the "Internet+" era, students access knowledge through diverse digital channels and expect a more dynamic and participatory learning environment. Consequently, there is an urgent need to transform traditional teaching methods to meet student needs, leverage digital technologies, and stimulate intrinsic learning motivation [8].

Secondly, the slow update of textbook content compared to the rapid evolution of Internet technology has become a significant barrier to the depth of student learning. The field of public management is undergoing profound changes due to the widespread application of digital technologies. New public issues, management concepts, and methodologies are constantly emerging, yet textbooks often fail to reflect these changes promptly. As a result, students miss critical opportunities to engage with the latest cases and practical data, making it challenging to develop a comprehensive and in-depth understanding of cutting-edge developments in public management. This not only affects the depth of students' learning but also weakens their ability to apply theoretical knowledge in real-world scenarios [9]. Therefore, the education sector needs to prioritize the continuous updating of educational materials, ensure that teaching content remains current, and urgently reform teaching methods and technologies to enhance educational effectiveness and quality. There is a pressing need to bridge the gap between theoretical knowledge and practical application in the field.

Finally, there is a notable lack of seamless integration between the curriculum system and ideological and political education. The curriculum system, crucial for achieving educational objectives and ensuring quality, comprises elements such as curriculum perspectives, objectives, content, activities, and assessment methods. These elements should collectively support the realization of curriculum goals and training objectives. Ideological and political education in the curriculum aims to organically integrate ideological elements into various aspects of teaching, using the curriculum as a vehicle to ensure that various educational elements converge effectively to form a synergistic educational force, serving the fundamental task of moral education and character development. In traditional education, disciplines often focus primarily on their specific course content, with a heavy emphasis on final examinations. The development of students' moral and ideological qualities is often confined to dedicated ideological and political courses, failing to fully exploit the value of implicit education for students' holistic growth [10]. Management quantitative analysis, being an interdisciplinary course, emphasizes the integration of relevant knowledge and practical application. However, the associated ideological and political education goals within the curriculum are often too generalized, the content system is incomplete, and the structure and teaching methodology still require significant optimization to meet the demands of modern education and societal needs.

Addressing these challenges requires a comprehensive approach that leverages digital technologies, updates curriculum content regularly, and integrates ideological and political education seamlessly into the course structure. This holistic reform will not only enhance the relevance and effectiveness of the Quantitative Analysis for Management course but also better prepare students for the complex challenges of modern public management in the digital age.

3. Connotations and Principles of Multi-dimensional Teaching Model Reform in the "Internet+ Curriculum Ideological and Political Education" Paradigm

The digital revolution characterizing the information age has profoundly transformed the educational landscape, with Internet technology at the forefront of this change. Within this context, "Internet+ Curriculum Ideological and Political Education" has emerged as an innovative pedagogical approach, spearheading the reform of ideological and political education in higher learning institutions. This concept places students at its core, seamlessly blending Internet technology with ideological and political education. It harnesses online resources and tools to revolutionize teaching methodologies, aiming to organically integrate knowledge dissemination with value orientation. The ultimate goal is to empower students, fostering their innovative spirit and collaborative skills, thereby enhancing their holistic development.

The principles guiding this educational reform are multifaceted. Foremost is the "student-centric" approach, which recognizes and prioritizes learners' individual needs, interests, and developmental trajectories. This principle is actualized through tailored educational experiences that cater to each student's unique learning style and aspirations. Next, the model emphasizes "resource integration," leveraging the vast potential of Internet technology to consolidate and optimize educational resources from diverse sources. This integration facilitates resource sharing and allocation, significantly enhancing the overall quality of education.

Another crucial principle is the emphasis on "practical learning." This aspect underscores the importance of hands-on experience in ideological and political education, utilizing cutting-edge technologies such as virtual laboratories and online training platforms. These tools provide students with immersive learning experiences, honing their practical skills and innovative thinking.

Lastly, the model places a strong emphasis on "value-oriented guidance." Within the framework of Internet-enhanced curriculum, it reinforces socialist core values, aiming to cultivate students' moral fiber and sense of social responsibility. This principle ensures that the educational process goes beyond mere knowledge transfer, instilling in students a strong ethical foundation and a commitment to societal well-being.

By adhering to these principles, the "Internet+ Curriculum Ideological and Political Education" model seeks to create a comprehensive educational experience that equips students not only with knowledge but also with the values and skills necessary to thrive in the modern world.

4. Implementation Strategies for Multi-dimensional Teaching Model Reform under the "Internet+ Curriculum Ideological and Political Education" Paradigm

The reform of multi-dimensional teaching models within the "Internet+ Curriculum Ideological and Political Education" paradigm necessitates a dual approach. Firstly, it must consider the specific attributes of the course—in this case, Quantitative Analysis for Management, which is characterized by high theoretical and practical components, strong applicability, and demanding software operation requirements. Secondly, it should adhere to the developmental pathway of "mastery of management quantitative theory—development of quantitative data skills—realization of curriculum ideological and political values". This reform employs three dimensions of empowerment—organizational, structural, and field—to reconstruct teaching practices.

(1) Leveraging Organizational Empowerment to Assess Student Learning and Construct a Precise "Internet + Textbooks + Online Courses" Teaching Model

Firstly, to address the diverse individual needs of students, online survey tools and dynamic student behavior measurement techniques can be employed. These methods collect students' expectations and opinions regarding professional courses, while continuous data monitoring reveals students' learning status, cognitive changes, career aspirations, and psychological well-being. This information forms a course-related database resource. Furthermore, professional value standards essential for public administration professionals are integrated into each chapter and component of the online course.

Secondly, the internet-assisted teaching process for Quantitative Analysis for Management should be designed and optimized. This involves a comprehensive design of teaching content, including management quantitative analysis theory, methodologies, and practical case studies, aimed at stimulating students' learning interest. The implementation of online teaching activities primarily relies on teacher guidance and moderation, with student self-directed learning, collaborative learning, and learning

outcome assessment as the main modalities [11]. In this process, students take on the primary role, with teachers providing timely guidance on learning progress and outcomes. Concurrently, teachers must continually refine their online teaching design and content based on feedback from student learning outcomes and the teaching process.

Thirdly, develop an internet-assisted teaching system for management quantitative analysis. The construction of this system is implemented in two phases: teaching preparation and teaching execution.

(a) Teaching Preparation Phase. Initially, we will compile online data science courses from domestic and international higher education institutions, conduct thorough screening, and integrate them into a comprehensive resource module. Next, we will collect and refine online public training courses to cater to students' expanded learning requirements. Lastly, we will synthesize classic textbooks and research papers to enhance their applicability in teaching practice, developing case studies for students to learn through emulation.

(b) Teaching Execution Phase. First, it is crucial to formulate reform strategies and design content based on the unique characteristics of different majors and their specific data analysis needs, segmenting the teaching content into distinct modules. Second, integrate and categorize the teaching modules and content from various majors into public and professional modules, actively produce teaching micro-videos, and design corresponding assignments. Finally, develop online interaction modules. Drawing from previous teaching experiences, we will identify common issues encountered by different majors in the public modules, design a FAQ model to facilitate large-scale teaching and online interaction. Additionally, we will create an online interactive Q&A model to address specific problems encountered by different majors in their professional modules.

(2) Leveraging Field Empowerment to Integrate In-class and Extracurricular, Online and Offline Activities, Promoting "Internet + Evaluation + Practical Investigation" Field Interaction

Comprehensive education encompasses multiple domains including on-campus and off-campus, curricular and extracurricular, online and offline. However, when these domains fulfill their core educational tasks, they inevitably face the challenge of achieving complementary interaction and comprehensive integration due to differences in functions, resources, and structures.

Firstly, enhance online and offline interaction both within and outside the classroom, emphasizing the significance of student discussions, study groups, and teacher guidance. This involves conducting online and offline discussions on common issues to promote in-depth learning and knowledge consolidation, as well as providing detailed explanations for online assignment completion and associated problems. Organize team training based on students' interests and research directions, designing relevant practical operation topics. Develop a course evaluation system based on student learning data using online questionnaires, virtual meetings, and webinars.

Secondly, incorporate a social practice component into the Quantitative Analysis for Management course, primarily completed through student research and social practice reports. Through this research process, students can gain insights into public management themes such as public interest, spirit of responsibility, and rule of law construction. Additionally, they can enhance their moral qualities through reflection on their research findings.

Thirdly, augment the application of statistical software in practical teaching. In the "big data" era, talent demands have evolved. Facing the challenge of large volumes of diverse data, effective data collection, organization, and statistical analysis have become more crucial than ever. Integrate statistical software into practical classroom teaching through online platforms and allocate sufficient computer learning time to enhance students' data processing abilities and deepen their understanding and mastery of the fundamental principles of management quantitative analysis.

(3) Leveraging Structural Empowerment to Deeply Integrate "Curriculum Ideological and Political Education", Enhancing the Educational Function of "Internet + Curriculum + Curriculum Ideological and Political Education"

In teaching Quantitative Analysis for Management courses, with practicality and application as core principles, the aim is to foster students' progress in knowledge assimilation, skill development, and value internalization, while simultaneously serving as an optimal channel for instilling personal, social, and professional values.

Firstly, develop MOOCs that incorporate curriculum ideological and political education. This forms a crucial foundation for the "Internet+" curriculum ideological and political education teaching model

reform [12]. Based on key professional knowledge and skills, uncover implicit "ideological and political elements" to construct an "Internet + Curriculum + Curriculum Ideological and Political Education" platform that integrates resources, teaching, learning, internship, and practical experiences.

Secondly, establish smart classrooms. The "Internet + Classroom" teaching model transcends temporal and spatial limitations, restructuring the educational ecosystem. The interdisciplinary integration of next-generation information technologies such as online learning, flipped classrooms, cloud classrooms, and micro-courses in education has catalyzed significant reforms in the educational ecological structure, encompassing environment, pedagogy, curriculum, learning, assessment, and management.

Thirdly, emphasize humanistic care and public service ethos, and establish cross-level learning support groups based on students' diverse needs. Undergraduate education often emphasizes foundational skills but lacks sufficient application. In contrast, graduate students, motivated by thesis requirements and supervisor guidance, have a strong impetus for application but may lack fundamental methods, especially in interdisciplinary courses. Therefore, forming mutual learning groups comprising both graduate and undergraduate students can facilitate comprehensive learning.

5. Conclusion

Guided by the "Internet+ Curriculum Ideological and Political Education" paradigm, higher education practitioners face the crucial task of reforming teaching models to achieve educational modernization. Through an analysis of the Quantitative Analysis for Management course characteristics, this paper proposes strategies for reconstructing the teaching model using internet technology, integrating three dimensions: organizational, field, and structural empowerment.

The study discusses methods for collecting student data through technological means such as online questionnaires and dynamic behavioral measurements to construct a precise teaching model. It also explores how to achieve deep integration of curricular and extracurricular, online and offline education through various means including online-offline interaction, social practice, and smart classrooms, thereby enhancing the educational function.

This paper investigates the implementation pathways for multi-dimensional teaching model reform under the "Internet+ Curriculum Ideological and Political Education" concept, aiming to provide valuable insights for higher education reform.

Acknowledgement

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