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DISCUSSION AND PRACTICE OF BLENDED TEACHING OF "URBAN GEOGRAPHY" BASED ON RAIN CLASSROOM

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Abstract: Against the backdrop of deep integration between information technology and education, blended learning has emerged as a key direction for curriculum reform in higher education. Taking the course *Urban Geography* as a case study, this paper explores the construction and implementation of a blended learning model based on the Rain Classroom Smart Teaching Tool. The study developed a "three-stage, six-step" blended teaching model encompassing pre-class independent learning, in-class deep interaction, and post-class consolidation and enhancement. Leveraging Rain Classroom's real-time interaction, data feedback, and online learning resources, the model effectively enhanced students' independent learning abilities, critical thinking skills, and patriotic sentiments, achieving a deep integration of professional knowledge transmission and ideological education within the curriculum.
Keywords: Rain classroom; Blended teaching; Urban geography

1 INTRODUCTION

2016 National Conference on Ideological and Political Work in Higher Education Institutions emphasized that "Universities should leverage classroom teaching as the primary channel and establish synergistic effects where all types of courses move in the same direction as ideological and political theory courses"[1]. *The 2020 Guidelines for Ideological and Political Education in Higher Education Institution Courses* explicitly called for "comprehensively advancing the integration of ideological and political education into all aspects of classroom teaching." *China Education Modernization 2035* also explicitly calls for "accelerating educational transformation in the information age and coordinating the development of integrated intelligent teaching, management, and service platforms." Against this backdrop, exploring innovations in curriculum-based ideological and political education supported by information technology to achieve multidimensional, in-depth development in education has become a crucial responsibility for faculty teaching specialized courses in higher education institutions.

Urban Geography is a required course for geography majors in higher education institutions. The course integrates natural, economic, social, and ecological dimensions, embodying distinct contemporary and societal relevance[2]. Its curriculum development must align with national goals for high-quality new urbanization and the development philosophy of "innovation, coordination, green development, openness, and sharing," cultivating professionals with patriotic commitment and global perspective who focus on sustainable urban and regional development. However, traditional classroom teaching models for Urban Geography suffer from insufficient interaction, awkward integration of ideological and political elements, and low student engagement, failing to meet the demands of talent cultivation in the new era. Rain Classroom, a smart teaching tool developed by Tsinghua University, offers functional advantages such as real-time interaction, data feedback, and resource sharing, providing technological support for blended learning [3]. Based on this, this study introduces Rain Classroom into the teaching practice of *Urban Geography* to explore a blended learning model integrating online and offline approaches. The aim is to enhance the effectiveness of ideological and political education by expanding its integration channels and methods, increase classroom interaction and student engagement, and cultivate students' critical thinking and innovative capabilities.

2 RAIN CLASSROOM'S ADVANTAGES IN EMPOWERING IDEOLOGICAL AND POLITICAL EDUCATION IN COURSES

Rain classroom is a smart teaching tool developed under the leadership of Tsinghua University. Its core concept is to reconstruct teaching processes by connecting pre-class, in-class, and post-class activities through mobile internet technology, thereby achieving teaching innovation supported by information technology[4]. For course-based ideological and political education, Rain classroom serves not only as an auxiliary tool but also as a bridge connecting "professional knowledge" with "value guidance"[5].

Through deep integration with WeChat and PowerPoint, Rain Classroom transforms students' mobile phones into learning terminals. Features like bullet comments, submission, random roll call, and real-time polling enrich classroom interaction formats. Students can instantly report confusion by clicking the "Don't Understand" button, enabling teachers to dynamically adjust teaching pace based on feedback data—achieving "teaching based on learning." This instant interaction mechanism breaks the limitations of traditional one-way teaching delivery, transforming students' approach to ideological and political education from passive reception to active construction.

Additionally, Rain Classroom features robust data collection and analysis capabilities to ensure precision in ideological

and political education. Rain Classroom can embed diverse resources such as MOOC videos, web links, audio explanations, and graphic materials, while simultaneously collecting multidimensional teaching data and presenting it through visualizations like charts. Leveraging Rain Classroom's data-driven approach, educators can precisely identify students' knowledge gaps in specialized subjects and gauge their interest in social hot topics. This enables targeted “drip irrigation” of ideological and political education tailored to students' knowledge foundations and ideological dynamics, ensuring the effectiveness and relevance of value guidance.

Finally, ideological and political education is an ongoing process that should not be confined to the 45-minute classroom session. Rain Classroom spans the entire teaching cycle from pre-class to in-class to post-class. Teachers use Rain Classroom to assign learning tasks and distribute preparatory materials before class, facilitate real-time interaction, conduct in-class quizzes, and enable live chat discussions during class, and post-class activities like national policy interpretations and practical assignments. This breaks the traditional classroom's temporal and spatial boundaries, allowing students to complete learning and submit reflections during fragmented time. This “all-day” learning environment enables the continuous infusion of ideological and political elements, strengthening the long-term mechanism for classroom ideological integration.

3 DESIGN OF A BLENDED LEARNING MODEL BASED ON RAIN CLASSROOM

Blended learning is an instructional model that integrates traditional face-to-face teaching with online learning. Its core lies in leveraging the strengths of both learning approaches to achieve a synergistic effect where the whole is greater than the sum of its parts [6]. This requires both the teacher's guiding, inspiring, and monitoring role in the teaching process and the full expression of students' initiative, enthusiasm, and creativity as the primary agents of their learning journey [7]. Rain Classroom possesses the characteristics of convenience, immediacy, diversity, and full-cycle functionality. Blended learning based on Rain Classroom not only meets the fundamental requirements of blended learning but also extends teaching time and space, enables instant learning feedback, facilitates diverse teaching interactions, and integrates multiple resources. This provides a natural, full-process integration scenario for course-based ideological and political education, achieving implicit education.

Aligning with the course characteristics and educational objectives of *Urban Geography*, the textbook content is restructured into six major knowledge units following a “principles-methods-practice” framework: Course Overview, Urban-Rural Classification and Urban Origins and Development, Urbanization, Urban Systems, Urban Space, and Urban Issues and Sustainable Development. The course's ideological and political education follows an “integrated” approach, seamlessly embedding ideological elements into the professional knowledge framework. This aligns with five core objectives: fostering patriotic sentiment, cultivating a scientific and pragmatic spirit, developing critical thinking grounded in dialectical materialism, strengthening social responsibility, and practicing core socialist values [8]. To achieve these goals, a “three-stage, six-step” blended teaching model was established (Figure 1). The three stages are pre-class, in-class, and post-class. The six components correspond to: pre-class resource distribution and learning task assignment via Rain Classroom; in-class assessment, case analysis, and real-time interaction through Rain Classroom; and post-class extended learning.

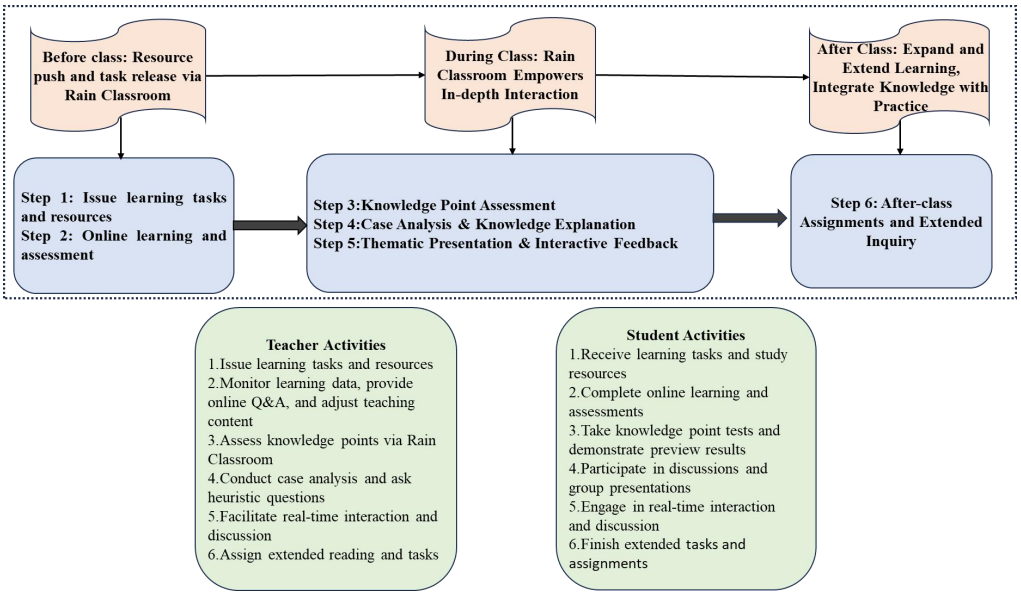

Figure 1 Diagram of the “Three-Stage, Six-Step” Blended Learning Model Based on Rain Classroom

4 TEACHING CASE STUDY: THE DISTRIBUTION OF URBAN SIZES

To demonstrate the practical effectiveness of Rain Classroom in blended learning models, this paper conducts a detailed analysis of the core chapter “Urban Scale Distribution” from the course *Urban Geography*.

4.1 Teaching Content Compatibility with Rain Classroom

"Urban Size Distribution" is a core chapter in the *Urban Geography* course, characterized by its strong theoretical foundation, data-intensive nature, and high policy relevance—making it highly compatible with the technical features of Rain Classroom. This chapter covers classic theories such as the Prime Number Law and the Size-Ranking Law, alongside quantitative measurement methods like the prime number index, urban pyramid, and q-value regression. It requires extensive data visualization and computational exercises to reinforce understanding. Additionally, academic debates surrounding "primacy distribution" and "rank-size distribution," along with the historical evolution of China's urban scale development policies, lend themselves well to stimulating critical thinking through real-time interaction and discussion.

4.2 "Three-Stage , Six-Step" Teaching Process

4.2.1 Before class: rain classroom resource distribution and assignment release

Two days prior to the start of classroom instruction, instructors use the "Pre-class Preparation" feature in Rain Classroom to push learning resource packages to students' mobile devices. These packages include course materials, reading resources (*National New Urbanization Plan (2014-2020)*, *Five-Year Action Plan for Deepening the Implementation of the People-Centered New Urbanization Strategy*), and self-assessment questions (covering fundamental concepts). They also assign the learning task "Summarize the characteristics of China's urban size distribution since 2010," guiding students to apply theoretical knowledge to analyze China's realities. This helps students correctly understand the guiding principles and policies for China's urban development, strengthen their confidence in the path of socialism with Chinese characteristics, and foster a sense of responsibility toward national development. This phase requires students to engage in independent study and complete preparatory tasks. Leveraging Rain classroom's robust digital resource integration and feedback capabilities, the two components of this stage enhance student engagement. Instructors can dynamically adjust teaching pace based on feedback data, achieving "teaching based on learning."

4.2.2 In class: rain classroom empowers deep interaction

Introduction: Students and teachers scan the QR code via WeChat to enter the classroom and sign in. The instructor uses Rain Classroom to distribute a timed quiz, quickly assessing students' grasp of fundamental concepts related to urban scale and theories of urban scale distribution. Simultaneously, the large screen displays real-time quiz results. Combining this with the anonymized bar chart of "pre-class preparation score distribution" pushed through Rain Classroom, the instructor guides students to observe which knowledge points remain insufficiently mastered and which require focused reinforcement, thereby clarifying learning objectives and key teaching points.

Case Study: Using their published paper "Spatio-Temporal Evolution of Urban Size Distribution in Jiangsu Province Based on Traditional and Fifth National Census Data" as an example, the instructor presents Jiangsu's urban size data and guides students in applying and analyzing theoretical knowledge. Interaction: The instructor poses a multiple-choice question via Rain Classroom: "What are the overall characteristics of Jiangsu's urban size structure?" After students respond, the instructor leads them in analyzing the underlying economic geography patterns revealed by the data. Theoretical Instruction: The instructor explains formulas using a PowerPoint presentation, incorporating two Rain Classroom features: ① A poll asking, "If $q > 1$, the urban size distribution is (A. Concentrated; B. Dispersed)." ② Real-time comments prompting, "If you have questions about the R^2 and q values in the formula, please send comments." The instructor analyzes and responds to both the poll and comment questions. Value Guidance: The teacher presents a chart on "Changes in Jiangsu Province's Urban Primacy" and, linking it to China's policy evolution from "strictly controlling large city sizes" to "promoting coordinated development of large, medium, and small cities," guides students to discuss "Which distribution model is better?" Students use the Rain Classroom comment function to share views, such as "Primacy distribution enhances efficiency" and "Ranking distribution promotes balance."Teacher's Summary: There is no universally perfect model; only development paths suited to national conditions exist. Ideological and Political Elevation: China dynamically adjusts its urban scale policies based on the practical realities of different developmental stages, embodying the scientific spirit of seeking truth from facts and advancing with the times. This strengthens students' political identification with the nation's development path.

Specialized Presentation: Based on the learning resources and assignments distributed via Rain Classroom prior to class, students presented in groups on the "Characteristics of China's Urban Size Distribution Since 2010." The teacher guides in-class discussions and student peer assessments by drawing on the important exposition in the Report to the 20th CPC National Congress that "building a coordinated development pattern of large, medium and small cities centered on urban clusters and metropolitan areas." Finally, students submitted their interpretations of the national new urbanization strategy via the "Submission" feature in the Rain Classroom platform. This teaching approach, which closely integrates professional knowledge with the latest national strategies, ignited students' patriotic enthusiasm and sense of mission.

4.2.3 After class: extending learning, integrating knowledge and action

Following the conclusion of classroom theory instruction and case studies, the instructor utilized the Rain Classroom platform to assign post-class group discussion assignments and practical tasks. The discussion assignment was titled: "Study the Report of the 20th CPC National Congress to understand the major strategic deployments for China's urban development in the new era and new stage. Discuss its significance, fundamental requirements, and primary tasks." The practical task was: "Drawing on the paper 'A Study on the Spatiotemporal Evolution of Urban Size Distribution in

Jiangsu Province Based on Traditional and Fifth National Census Criteria,' collect relevant statistical data to analyze changes and underlying reasons in Jiangsu's urban size distribution since 2008." The class was randomly divided into six groups using Rain classroom's "Random Grouping" feature, preventing the formation of fixed cliques from self-selected groups. This design extends the classroom to the national policy level, serving not only as a consolidation of professional knowledge but also as an in-depth interpretation of major national policies. It encourages students to integrate their personal professional development into the broader national development landscape, achieving immersive ideological and political education throughout the process.

4.3 Teaching Outcomes and Reflections

The blended learning model based on the Rain Classroom platform achieves teaching and learning in "Urban Scale Distribution" by optimizing and integrating various educational resources. Pre-class online learning resource packages enable students to master fundamental theories and methodologies of urban scale distribution through self-directed learning and team research. This approach fosters proactive critical thinking and problem-solving, cultivating students' independent learning abilities and innovative thinking skills. In class, the Rain Classroom teaching tool is employed alongside diverse instructional methods—including heuristic teaching, multimedia presentations, case studies, thematic discussions, and classroom debates—to guide students in accurately grasping the objective realities, emerging trends, and distinctive features of China's urban development. This enables them to correctly understand China's urban scale development policies, thereby strengthening their "Four Confidences" in socialism with Chinese characteristics. Students develop a sound perspective on urban scale development, cultivating rational thinking and a commitment to truth-seeking. Post-class assignments distributed via Rain Classroom facilitate the practical application of specialized knowledge. This approach encourages students to actively think and explore problems, learn to utilize various supplementary resources to design solutions, and enhance their ability to apply theoretical knowledge to analyze real-world issues.

As a new product supported by information technology, Rain Classroom offers fresh approaches to teaching innovation and enhancing student engagement in the classroom. While its operation is relatively simple and convenient, mastering its use requires teachers to invest more time and effort—including preparing and uploading materials before class, selecting questions for in-class quizzes, and summarizing data feedback afterward. Therefore, compared to traditional teaching models, the blended learning approach based on Rain Classroom presents a significant challenge for most educators. Teachers using Rain Classroom must possess solid theoretical knowledge to promptly address student inquiries, cultivate proactive learning and innovative inquiry skills, and simultaneously guide students toward developing scientific values and worldviews. By curating high-quality online resources and facilitating real-time interactions, educators can promote traditional culture, nurture exemplary character, and achieve comprehensive ideological and political education throughout the curriculum. Furthermore, the deep integration of Rain Classroom relies heavily on mobile devices. Ensuring that both teachers and students avoid becoming overly reliant on phones—truly placing students at the center of the learning process while using phones solely as tools and AI as learning assistants—is another critical consideration for implementing blended learning with Rain Classroom.

5 CONCLUSION AND OUTLOOK

Fully leveraging information technology to explore the organic integration of ideological and political education with professional education is a vital responsibility for university faculty in the new era. As a smart teaching tool, Rain Classroom provides robust technical support for the development of ideological and political education within university required courses through its data-driven, real-time interactive, and seamlessly integrated features. This study systematically examines the construction and implementation of a blended teaching model based on Rain Classroom, using Chapter 7"Urban Scale Distribution"of the required geography course *Urban Geography* as a case study. Findings indicate that Rain Classroom, as a smart teaching tool, effectively enhances teaching precision, student engagement, and the effectiveness of ideological and political education through its comprehensive support process: "data-driven pre-class preparation—deeply embedded in-class interaction—continuous post-class feedback tracking."

Based on the Rain Classroom application, this paper constructs a "three-stage, six-step" blended teaching model. In the practical application of the "Urban Scale Distribution" teaching case, Rain Classroom's features—such as real-time interactive comments, instant quizzes, submission displays, and data visualization—align seamlessly with the data-intensive and spatially analytical nature of geography. This integration facilitates a shift in teaching decision-making from "experience-driven" to "data-driven." Simultaneously, this blended teaching approach effectively breaks temporal and spatial constraints, enriches channels for integrating ideological and political education, and achieves synchronized resonance in knowledge transmission, competency development, and value cultivation. Students transition from passive knowledge recipients to proactive learners embodying patriotic sentiment, scientific spirit, and innovative capabilities. The blended teaching model for urban geography, powered by Rain Classroom, fully accomplishes knowledge objectives, competency goals, and ideological-political objectives, realizing mutual growth through teaching and learning.

The blended learning model based on Rain Classroom imposes higher demands on both teachers and students. Throughout its implementation, we must adhere to the principle that "technology serves education" and ensure the rational application of smart teaching tools. Moving forward, we will continue to deepen the integration of Rain

Classroom into teaching practices, further explore its student learning analytics capabilities, develop big data-driven profiles of students' ideological and political qualities, and advance personalized teaching models powered by modern intelligent technologies. These efforts aim to foster an intelligent educational ecosystem that promotes students' holistic development [9]. Simultaneously, we will expand the "virtual simulation + Rain Classroom" practical teaching model and continuously refine the ideological and political education framework for the *Urban Geography* course. We remain committed to cultivating new-era geography professionals equipped with a sense of national pride, scientific spirit, and practical capabilities.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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