National Mathematics Class: A Math Classroom Immersed in Patriotic Education—Also Discussing the Implications for the Professional Development of Young Mathematics Teachers

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Abstract: Under the background of the "Great Ideological and Political Education" in the new era, mathematics courses are expected to achieve ideological and political education. However, there is a tendency of "cultural aphasia" and "value alienation" in current primary and secondary school mathematics classrooms. In response, this paper analyzes the solutions from the connotation of Chinese-style mathematics courses, Mr. Hua Yinglong's teaching practices in Chinese-style mathematics courses, and the development of such courses. Guided by this analysis, it proposes the implications of Chinese-style mathematics courses and Mr. Hua's teaching wisdom for the professional development of young teachers. These implications include: ideological transformation from "knowledge transmitter" to "value guide" by establishing roots and fostering spirit; competency transformation from "textbook executor" to "resource developer" through curriculum creation; and action transformation from reliance on experience to "learning-research-practice-reflection" for professional advancement.

Keywords: National Mathematics Course; Patriotic Education; Curriculum Ideological and Political Education; Teacher Professional Development

DOI:10.12417/3029-2328.26.01.015

In the context of the new era, promoting the deep integration of patriotic education with subject teaching and fulfilling the fundamental task of fostering virtue through education has become a core issue in educational reform. The "Compulsory Education Curriculum Plan (2022 Edition)" highlights the inclusion of "cultural confidence" and "patriotic sentiment" into mathematics courses, enabling them to serve an educational function by guiding students to understand the relationship between mathematics and national development, thereby enhancing cultural confidence and social responsibility.[1]

However, there is currently a tendency toward "cultural aphasia" and "value alienation" in primary and secondary school mathematics classrooms. Teachers often narrow mathematics teaching to "problem-solving drills," overlooking the cultural genes and historical context behind the knowledge. Students' understanding of mathematics remains at an "instrumental" level, making it difficult for them to appreciate the deep connection between mathematics courses and national destiny as well as the national spirit. In response, this paper, grounded in the broader ideological and political context of the new era curriculum, attempts to explore the educational principles of integrating national elements into mathematics courses by examining the connotations of such courses, the teaching practices of Mr. Hua Yinglong (hereinafter referred to as "Mr. Hua"), and the development of these courses. The aim is to provide some insights for the professional growth of young teachers.

1.The Connotation and Practice of National Mathematics Curriculum

1.1 Interpretation of the Concept of National Mathematics Curriculum

"The National Mathematics Course" is an abbreviation for mathematics courses that strengthen patriotic education. It represents Mr. Hua's renewed sense of mission in teaching mathematics for the motherland, a new endeavor to imbue mathematics classes with a patriotic foundation, and a new model for the high-quality

Funded Projects: 2023 Beijing Union University Research Project "Construction and Application of Reverse Teaching Evaluation Standards for Primary School Mathematics Curriculum" (Project No.: SK10202303); Beijing Municipal Education Commission General Social Science Project "Construction, Application, and Validation of a Teaching Competency Model for Normal University Students from a STEM Perspective" (Project No.: SM202411417013)

development of education in China's new era. The "National Mathematics Course" selects appropriate "Chinese stories" from excellent traditional Chinese culture, revolutionary culture, and advanced socialist culture, connecting patriotism with mathematics. This approach not only uses "Chinese stories" to teach mathematics effectively but also employs mathematics to tell "Chinese stories" compellingly, adding warmth to mathematics through patriotism and rationality to patriotism through mathematics.[2]

1.2 Mr. Hua's Teaching Practice in Mathematics

Mr. Hua proposed that the essence of "National Mathematics Curriculum" is to transform mathematics from a "tool-based discipline" into a "cultural existence." Mathematics embodies the wisdom of Chinese civilization and reflects the nation's ways of thinking and spiritual codes. The National Mathematics Curriculum is generally divided into two categories: one consists of textbook-based teaching content, contextualized with Chinese stories to help students learn mathematics through these narratives; the other involves teaching content not found in textbooks, independently developed by teachers based on curriculum standards. These comprehensive and practical courses, accounting for 10% of the total class hours, emphasize interdisciplinary thematic learning, using mathematical perspectives, mathematical thinking, and mathematical language to tell Chinese stories well.[3]

In the practice of teaching national mathematics, Mr. Hua believes in fully exploring the educational resources within the history of mathematics to guide students in appreciating the cultural subjectivity of Chinese mathematics. Mr. Hua also proposed that mathematics should be closely integrated with China's contemporary technological achievements and social development, which he described as a "living culture." Mr. Hua also emphasizes exploring revolutionary culture by integrating mathematics with patriotic sentiments.

2.Development and Design Path of National Mathematics Course

2.1 Policy Traceability: Implementation of Relevant Documents from the Ministry of Education

In 2021, the Ministry of Education issued the "Two Guidelines," stating: "Education on revolutionary traditions and outstanding traditional Chinese culture must be implemented in all aspects of the educational process, including curriculum materials, teaching, and learning." [4]The "Compulsory Education Mathematics Curriculum Standards (2022 Edition)" (hereinafter referred to as the "New Curriculum Standards") emphasize in the section on comprehensive and practical requirements: "Enhance the ability to solve real-world problems and develop core competencies." In the section on "Focusing on Textbook Innovation," the "New Curriculum Standards" suggest: "Highlight the great mathematicians in the history of mathematics, especially ancient and modern Chinese mathematicians, and their contributions to the development of human civilization, to strengthen students' patriotic spirit and national pride."[5] On January 1, 2024, the "Patriotic Education Law of the People's Republic of China" came into effect, and the 2024 National Education Conference once again emphasized the fundamental task of fostering virtue through education. These factors constitute the macro-policy background for the emergence of "National Mathematics Lessons." The responsibility of mathematics teachers is not only to teach calculation but also to teach what to calculate and why to calculate. "National Mathematics Lessons" calculate China's development, utilize Chinese wisdom, and convey a sense of national sentiment. This deep interpretation of policy has become the primary motivation for promoting "National Mathematics Lessons." Based on this, Mr. Hua created a series of mathematics lessons with strong patriotic themes, such as "Chen Jingrun Teaches Us Mathematics," "Laozi Teaches Us Mathematics," "The Chinese Zodiac," "The Beauty of Military Parades," "Half a Quilt," and "Hua Luogeng Teaches Us Mathematics," truly integrating patriotic education organically into mathematics classrooms.[6]

2.2 The Mission and Responsibility of Cultural Inheritance: Responding to the Questions of the Times

The development and practice of Mr. Hua's mathematics curriculum was by no means accidental but stemmed from his profound dedication to the nation. On May 22, 2022, People's Daily published an article titled "The 'Grand Ideological and Political Course,' a Major Priority in the General Secretary's Vision." The so-called "Grand

Ideological and Political Course" aims to establish an all-encompassing educational framework that involves everyone, spans the entire process, and covers all aspects of nurturing students ideologically and politically. Teachers across all disciplines should shoulder the responsibility of educating students. Mr. Hua took this "major priority of the General Secretary" to heart and, together with teachers from his studio, developed a series of courses, including "Zu Chongzhi Teaches Us Mathematics," "Chern Shiing-Shen Teaches Us Mathematics," "Shing-Tung Yau Teaches Us Mathematics," "Liu Hui Teaches Us Mathematics," "Mathematics in China's High-Speed Rail," "Mathematics in the Long March," "Rediscovering Suzhou Numerals," "Mathematical Beauty in the Founding Ceremony — The Golden Ratio," "Mathematics in the History of the Communist Party of China," "Data Exhibition: Unity is Strength," and "The Story of Three (Four) Hundred Stars." Through these practical actions, he has realized his aspiration of "cultivating the educational field to strengthen the nation."[7]

The development of Mr. Hua's "National Mathematics Course" stems from his long-term observation and practical reflection on elementary school mathematics classrooms. Traditional mathematics teaching often exhibits a tendency to "emphasize knowledge over culture" and "prioritize skills over values," leading students to perceive mathematics merely as a "problem-solving tool" and making it difficult for them to develop emotional identification and cultural belonging. Mathematics is a shared treasure of human civilization, and ancient mathematics has made unique contributions with its profound spiritual core. The "Gaitian Theory" and the Pythagorean theorem proposed in the Zhou Bi Suan Jing appeared approximately 500 years earlier than in the West. The Nine Chapters on the Mathematical Art systematically summarized mathematical achievements from the Warring States period to the Han Dynasty, containing 246 applied problems. Its concepts of "using surplus to compensate for deficiency" and "balancing input and output" influenced the development of mathematics in later generations. Liu Hui's Commentary on the Nine Chapters introduced the "concept of limits," laying the ideological foundation for the birth of calculus. Qin Jiushao's Mathematical Treatise in Nine Sections proposed the "Dayan Qiuyi Algorithm" about 500 years earlier than in Europe. These achievements are the crystallization of the wisdom of ancient scientists in "observing phenomena to determine time" and "applying knowledge for practical use." Today, Mr. Hua's National Mathematics Course serves as the best response to enhancing students' patriotic sentiments and cultural confidence.

2.3 Deep Needs of Child Development: Achieving Comprehensive Growth through Cultural Immersion

The motivation for children's learning stems not only from "interest" but also from "emotional resonance." In traditional mathematics instruction, students often develop anxiety toward the subject due to "unfamiliar problems and mechanical calculations." In contrast, the National Mathematics curriculum incorporates Chinese stories and local examples, fostering a strong sense of belonging — "I am connected to Chinese mathematics" — thereby stimulating students' intrinsic motivation to learn math. For instance, in the study of circles, China ' s earliest mathematical text, *Zhou Bi Suan Jing*, documented that "the circle arises from the square, and the square arises from the right angle." Mencius wrote in *Li Lou Chapter I*: "Without the compass and square, one cannot form squares and circles." Mozi stated: "A circle has one center and equal lengths throughout." In teaching about circles, educators introduce cultural elements such as the circular structure of the Hall of Prayer for Good Harvests at the Temple of Heaven and the full moon admired during the Mid-Autumn Festival. They guide students to ponder why ancient people favored circular shapes. By measuring the diameter of the Hall of Prayer and calculating its circumference, students discover that the circle is the most symmetrical and harmonious of all shapes. This leads them to reflect on traditional Chinese cultural values of reunion and harmony. Such culturally enriched mathematical learning experiences shift students from passive problem-solving to active exploration.

3.Implications of National Mathematics Courses for the Professional Development of Young Mathematics Teachers

3.1 Establishing Roots and Casting the Soul: The Ideological Transformation from "Knowledge Transmitter" to "Value Leader"

First and foremost, young teachers must undergo a fundamental shift in their mindset, transforming from "knowledge transmitters" into "cultural inheritors" and "value guides." They should possess a strong desire to educate students for the Party and cultivate talent for the nation. Before each class, they should proactively consider questions such as: "How does the knowledge in this lesson relate to China's excellent traditional culture?" "Does it embody the striving spirit of revolutionary predecessors?" "Can this math course reflect contemporary China's scientific and technological achievements?" For example, when teaching "pi," it is essential not only to explain Zu Chongzhi's calculation methods but also to supplement the evolution from "three times the diameter is the circumference" as recorded in the *Suishu Lü Lizhi* to "Hui's ratio" and "Zu's ratio," allowing students to appreciate the spirit of relentless pursuit of precision in ancient Chinese mathematics. In statistics and probability lessons, introducing cases such as poverty alleviation data monitoring, epidemic prevention and control models of population movement, and other examples enables students to experience the practical value of mathematics in national governance.

3.2 Curriculum Creation: The Transformation from "Textbook Implementer" to "Resource Developer"

Mr. Hua's practice demonstrates that an excellent "National Mathematics Course" requires teachers to proactively develop curriculum resources, stringing scattered "cultural pearls" into a systematic "educational necklace." Mr. Hua led his team to compile three major resource libraries: Chinese wisdom in the history of mathematics, the application of mathematics in national construction, and the power of mathematics in revolutionary culture. Young teachers need to break through the limitations of "teaching strictly by the textbook," transitioning from "textbook implementers" to "resource developers" by establishing categorized resource libraries and organizing available materials thematically. For example, categories may include cultural heritage, national achievements, and revolutionary spirit. Young teachers should continuously accumulate and systematically categorize these materials in their daily teaching.

The cultural heritage category includes the "Gaitian Theory" and astronomical measurements from the *Zhou Bi Suan Jing*, the "Chickens and Rabbits in the Same Cage" problem and ancient algorithms from the *Sunzi Suan Jing*, and the "land measurement methods" found in Dunhuang murals. The national achievements category covers the curve design of the Hong Kong-Zhuhai-Macao Bridge, the orbital calculations for the Chang'e lunar exploration mission, and the data center layout of the "East Data, West Computing" project. The revolutionary spirit category includes map surveying and scale application during the Long March, grain production statistics and average calculation teaching in the Yan'an Great Production Movement, and codebreaking in the Liberation War.

Additionally, schools can develop localized courses based on regional characteristics and design thematic learning activities. For example, teachers in Zhejiang might develop "Measurement Wisdom of Liangzhu Ancient City," those in Shaanxi could design "The Arrangement Patterns of the Terracotta Warriors," and educators in revolutionary base areas might explore "Economic Statistics in the Central Soviet Area" along with data organization and percentage applications.

3.3 Professional Advancement: Transitioning from "Experience Dependency" to an Action-Oriented Approach of "Learning—Research—Practice—Reflection"

"The development and practice of the 'National Mathematics Course' was not accidental; it stems from Mr. Hua's profound reflection on the essence of education and over 30 years of continuous professional dedication. Mr. Hua has published several works, including 'What Education Should Leave Students,' 'Hua Yinglong and Mistake-Based Education,' 'Teaching Mathematics with Chinese Stories,' and 'This Is How I Teach Mathematics.' Mr.

Hua once said, 'Teachers' professional growth begins with reading and is achieved through research.' Leading his team, Mr. Hua not only extensively studied works on the history of mathematics, pedagogy, and cultural studies but also continuously optimized curriculum design through 'lesson study' and 'action reflection.' Young teachers should transition from relying on experience to engaging in active research, establishing a closed loop of 'learning—research—practice—reflection,' proactively acquiring interdisciplinary knowledge, and developing their personal teaching styles by addressing real-world teaching challenges. Young teachers can enhance their curriculum development capabilities through thematic reading plans, lesson study, teaching reflection, and other methods."

Specifically, first, develop a thematic reading plan to build a knowledge base. Thematic reading can include three categories: history and culture of mathematics, educational policies and theories, and practical case studies. For example, read books on the history and culture of mathematics such as *History of Chinese Mathematics*, *Introduction to Mathematical Culture*, and *Selected Readings from Ancient Chinese Mathematical Classics*; study policy documents like the *Guidelines* and the *New Curriculum Standards*; and explore practical case studies such as *I Am Mathematics*, *I Am More Than Mathematics*, *Hua Yinglong and Mistake-Tolerant Education*, *Teaching Mathematics with Chinese Stories*, and *When the Country Needs Me, I Teach — Explorations in National Mathematics Lessons*.Second, conduct lesson case studies. Young teachers can use "National Mathematics Lessons" as a platform to carry out cyclical research involving "lesson preparation—teaching—observation—evaluation—reflection." To address the question of "how to naturally integrate revolutionary culture into the lesson," they can collaborate with the teaching research group for collective lesson preparation, design multiple versions of teaching plans, record student reactions through classroom observations, analyze the effectiveness of "cultural integration points," and develop replicable teaching strategies.Third, maintain reflective journals. Young teachers should document daily highlights, sticking points, challenges, obstacles, and pain points in the classroom. For instance, if students show keen interest in the details of "Zu Chongzhi's calculation with counting rods" during a discussion on "pi," the teacher can reflect on "how to supplement background knowledge about ancient calculation tools." If students struggle to understand "the mathematical principles of the BeiDou Navigation System," they can note "the need to simplify coordinate system knowledge and use more intuitive animations for demonstration." Young teachers must set sail with practice and row with reflection, exploring the way of educating that belongs to this era in the field of education.

In summary, the National Mathematics Course is essentially an educational approach that uses mathematics to activate cultural identity and nurtures patriotic sentiments through cultural enrichment. It requires teachers to transcend the limitations of knowledge-based instruction and reimagine mathematics education from the perspective of cultural heritage and national future. Education is not merely the transmission of knowledge but also a cross-temporal cultural dialogue. The role of teachers extends beyond teaching mathematics—it involves educating through mathematics, cultivating Chinese individuals with roots, soul, and warmth.

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