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2025 Volume 3, Issue 6
Lecture Notes in Education, Arts, Management and Social Science
ISSN(Online): 2705-053X

Practical Research on Stratified Teaching Management and Home-School-Community Collaborative Education Model under the Background of "Double Reduction-- A Case Study of the 2024 grade of High School in Jiangnan Campus of Nanning No. 36 Middle School

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Abstract: After the implementation of the "Double reduction" policy, students in Grade 10 of Nanning No. 36 Middle School have shown practical problems such as a significant increase in autonomous time but insufficient motivation for learning, disorderly management of vacation time (such as addiction to electronic devices and disrupted schedules), and poor implementation of stratified teaching due to difficulties in dynamic adaptation. Based on the actual situation of model high schools in ethnic areas, this study takes the first year of high school as the research object, aiming to construct a theoretical model and practical path of the integration of "big data precise stratified teaching management" and "home-school-community collaborative education", through dynamic learning situation diagnosis, personalized resource matching and home-school-community resource integration, To address problems such as weakened motivation for self-study and insufficient time planning ability of students, and to promote individualized development and comprehensive quality improvement of students. The research found that by relying on the school's self-developed "Runjian" big data system for hierarchical dynamic adjustment (the in-school survey questionnaire data in 2025 showed that the accuracy of homework matching improved by 37%), combined with the construction of parent school courses and community practice bases (the satisfaction rate of home-school collaboration reached 89%), it can effectively stimulate students' intrinsic motivation and cultivate their self-management ability. This study proposes a dual-track strategy of "technology empowerment + humanistic collaboration" to provide theoretical support for the deepening implementation of the "double reduction" policy in the high school stage and has practical reference value for the innovation of talent cultivation models in the AI era.

Keywords: "Double Reduction" policy; Stratified teaching; Home-school-community collaboration; Big data for precision education

Online publication: July 26, 2025

1. Introduction

In July 2021, the General Office of the Central Committee of the Communist Party of China and The General Office of

the State Council issued the "Opinions on Further Reducing the Homework Burden and Off-Campus Training Burden of Students in the Compulsory Education Stage", marking the full implementation of the "double reduction" policy. The policy aims not only to reduce the excessive homework burden and off-campus training burden on students, but also to reconstruct the educational ecosystem and promote the all-round healthy development[1] of students. The core essence of the "double reduction" policy is not simply to give students more rest time, but to optimize the supply of education to provide students with the "nutrition" needed for all-round development in terms of intelligence, morality, art and physical fitness, and to grow into well-rounded individuals[1] in terms of morality, intelligence, physical fitness, aesthetics and labor. In this context, how to improve the quality of education and teaching in schools, implement the concept of teaching students according to their aptitude, and build a collaborative education community has become an important issue that urgently needs to be explored in the field of education.

Stratified teaching, as a concrete practice of the principle of teaching students according to their aptitude, has shown unique value in the context of the "double reduction" policy. By scientifically stratifying students based on their learning foundation, cognitive abilities and development needs, and designing differentiated teaching objectives, contents and evaluation methods, it can effectively avoid the drawbacks of the "one-size-fits-all" teaching approach and enable each student to achieve appropriate development[2] on their original basis. In recent years, with the advancement of the new college entrance examination reform, the stratified and class-shifting teaching model in the high school stage has been continuously improved, achieving certain results[3] in enhancing classroom teaching efficiency and meeting students' individualized learning needs. However, in the context of higher requirements for the quality of in-school education under the "double reduction" policy, the management mechanism, implementation path and alignment with policy goals of stratified teaching still need to be further optimized.

At the same time, the policy explicitly calls for "improving the home-school-community collaboration mechanism... Promote the construction[4] of collaborative education communities. Education is a systematic project, and the all-round development of students cannot be achieved without the joint efforts of families, schools and society. The "trinity cycle" collaborative education system proposed by scholars such as Ye Haibo points out that family education should be the foundation, school education the core, and social education the guarantee, clarify the functions of the three parties, and build an all-space and all-process education system. Liu Shuxiu, starting from the theory of overlapping influence domains, emphasizes that families, schools and communities should form a consensus on education, clarify the boundaries of responsibility and establish an efficient communication mechanism[5]. However, in practice, home-school-community collaborative education still faces problems such[6,7] as complex goals, poor cooperation, and inefficient communication, especially in the context of stratified teaching, how to guide parents to understand the stratified concept, how to integrate social resources to support stratified teaching, and how to form an educational synergy have become urgent practical problems to be solved.

At present, certain achievements have been accumulated in research on stratified teaching and home-school-community collaborative education. In terms of stratified teaching, scholars have explored the model design, management strategies, implementation results and[8,9,10] challenges of stratified class rotation; In terms of home-school-community collaboration, researchers analyzed the predicaments, theoretical basis and practical paths[11,12,13] of collaborative education. However, there are few studies that combine the two and systematically explore the integration of stratified teaching management and the home-school-community collaborative education model in the context of "double reduction". In fact, the effective implementation of stratified teaching requires the understanding and cooperation of families as well as the support of social resources; The deepening of home-school-community collaboration also needs to be based on a scientific teaching management model. Therefore, exploring the practical path of the organic integration of the two is of great theoretical and practical significance for solving the problems in the implementation process of the "double reduction" policy and improving the quality of education.

Based on the background of the "Double reduction" policy, this study takes the high school education stage as the research object and focuses on the integrated practice of stratified teaching management and the home-school-community

collaborative education model. By analyzing the implementation value and challenges of stratified teaching in the context of "double Reduction", and in combination with the actual needs of home-school-community collaborative education, explore the construction of a mutually reinforcing and synergistic practice model, aiming to provide references for improving the quality of high school education and teaching and promoting the effective implementation of the "double Reduction" policy.

2. The real predicament and theoretical demands of high school education in the context of "Double reduction"

2.1. Imbalance and Challenges in Students' Autonomous Learning Ecosystem

After the implementation of the "double reduction" policy, high school freshmen have significantly increased their discretionary time (by 2-3 hours per day), but the lack of self-study ability leads to low efficiency in time utilization - less than 40% of students can effectively plan this time. The core of this contradiction lies in the fact that students who have been in a strongly constrained external environment for a long time lack the experience and ability of self-management and are prone to confusion in the face of the sudden increase in free time.

The problem of disorder in time management during holidays is particularly prominent. During winter and summer vacations, students use electronic devices for more than five hours a day on average, and nearly 78% are addicted to games, which directly leads to disrupted schedules. The back-to-school tracking data shows that it takes three weeks for such students to get back to school, far more than the one week for the control group, and they show the characteristics of "Monday syndrome" (significantly lower efficiency at the beginning of each week), reflecting a systemic defect in self-regulation ability.

From the perspective of educational goals, there is a significant gap between the all-round development and individualized growth advocated by the "Double Reduction" policy and students' current ability to plan independently. The traditional education model overemphasizes uniform standards and external control while neglecting the cultivation of autonomy, resulting in students being at a loss when they gain autonomy over time. This phenomenon confirms the core idea of constructivist learning theory that true learning should be based on active construction, and the current education system has a systematic deficiency in the cultivation of autonomous learning ability[14].

2.2. Bottlenecks and Reflections in the Practice of stratified teaching

Although stratified teaching is highly anticipated, it faces multiple bottlenecks in practice. At the classroom level, differentiated teaching is constrained by teachers, class size and management mechanisms. Only 35% of senior high school teachers can design teaching activities suitable for students of different levels, and most still adopt the "one-size-fits-all" model. This is related to both the professional competence of teachers and the orientation of school evaluation mechanisms[15].

Misplacement of homework design is another prominent issue. Psychological research shows that long-term exposure to mismatched learning tasks can lead to "learned helplessness." Data from Class 2407 of our school shows that in classes with uniform difficulty homework, the self-efficacy of students with learning difficulties is 15% lower than before stratification, while in classes with precise stratification, it is on the rise, highlighting the importance of stratification of homework.

The traditional static stratification model has struggled to meet the demands of the "double reduction" policy. The "double reduction" policy emphasizes respect for individual differences and dynamic development, while the existing stratification mechanism is rigid and inflexible, lacking flexible adjustment space. Social constructivist theory points out that learning is a continuous constructive process and that student development is non-linear and abrupt, which requires that stratified teaching must establish a dynamic response mechanism in order to truly achieve teaching according to individual aptitude.

2.3. Demands for the cultivation of core competencies oriented towards the future

The era of artificial intelligence sets new requirements for talent cultivation. The Future of Jobs Report of the World Economic Forum points out that critical thinking, problem-solving and self-management skills will become core workplace skills in 2025, which requires education to break through time and space limitations and provide students with opportunities for exploration and practice. The time window created by the "double reduction" policy makes this possible, but how to utilize it remains a challenge.

Home-school-community collaboration in education is an inevitable choice to meet future challenges. Modern educational ecological theory emphasizes that student growth is the result of the combined action of multiple educational forces. Our school's practice shows that students who participated in the home-school-community interaction scored significantly higher in social adaptability than the control group, confirming the Brown-Fin-Brenner ecosystem theory that student development requires the coordinated support of micro, meso and macro systems. Especially after the implementation of the "double reduction" policy, the regulation and rectification of off-campus resources have highlighted the urgency of building a three-in-one system of home, school and community.

The core of future education is to cultivate the ability to cope with uncertainties. In the context of globalization, with the acceleration of knowledge renewal and the transformation of occupational forms, education needs to shift from imparting knowledge to cultivating core competencies. New approaches such as project-based learning and research-based learning need the time support created by the "double reduction" policy, but there is still a tendency in current education to focus more on knowledge than ability and results than process, which is disconnected from future demands. Dewey's "education as growth" theory suggests that the essence of education lies in cultivating the ability of continuous learning and self-renewal, which has special guiding significance during the deepening period of "double reduction".

3. Big Data Empowerment and the Construction of a Home-School-Community collaborative Education Model

3.1. A Precise stratified teaching Optimization path Based on the Runjian Big Data System

The Runjian big data system, based on educational measurement and learning analytics technology, builds a dynamic learning situation diagnosis model by collecting multi-dimensional data such as classroom performance, homework quality, test scores, etc. The system not only tracks learning trajectories, but also identifies cognitive characteristics and learning styles through algorithms, providing a scientific basis for stratification. The generated learning profiles help teachers achieve closed-loop management of stratification of teaching objectives, content matching and resource push.

Dynamic stratification is at the core of the system. The system divides students into different levels based on their learning ability, mastery of knowledge, and cognitive level and updates them regularly. Teachers can make[11] flexible adjustments based on their experience. In the classroom, teachers design differentiated activities based on the levels; For homework, the system pushes appropriate materials and questions based on mistakes and mastery of knowledge points. The 2025 grade data showed that this mechanism improved the accuracy of homework matching by 37%, increased classroom engagement by 22%, and significantly optimized learning outcomes.

The personalized homework system follows the principle of differentiation, accurately identifying weak points in students' knowledge points and adjusting the difficulty and type of homework: students with a high rate of calculation errors are given basic training questions, and students with weak concept understanding are given mind maps and analytical materials. This consolidates weak points, avoids academic anxiety and restores confidence in learning.

3.2. A system of strategies for stimulating intrinsic motivation and developing autonomy through home-school-community collaboration

The collaborative education model aims to stimulate intrinsic interests and develop abilities in time management, planning, and metacognitive strategy selection. In practice, grades design project-based learning tasks through interest assessment to

help students explore their areas of interest in depth; Time management courses are carried out with class teacher micro-teams, guiding students to plan tasks and make daily plans using the "four-quadrant method"; Provide subject learning methods manuals, recommend personalized strategies based on students' learning conditions, and develop efficient habits.

The in-depth collaboration mechanism between home and school is the key. Schools use the Runjian system to synchronize homework volume, test feedback and school performance in real time, helping parents keep track of students' movements. Based on this, regular parent training sessions are conducted, covering creating a home learning environment, effective communication and learning plan support; Jointly design learning planning lectures and career exploration workshops to help students set clear goals and boost motivation.

Integration of community and school resources expands learning space. The school collaborates with community libraries and science and technology museums to develop three types of practical projects: social service (such as guidance on smart devices for the elderly), interest expansion (intangible cultural heritage inheritance, robot programming as an elective), and research-based learning (conducting water quality monitoring of the Yong River in collaboration with universities), allowing students to apply knowledge in real situations and cultivate research and problem-solving abilities.

3.3. A theoretical framework that supports all-round development through the collaborative education model

Collaborative education builds a three-in-one support network of schools, families and communities: schools lead learning strategies and resource supply, families supervise plan implementation and environment creation, and communities provide practice venues and activity opportunities. This network guides students to gradually grow into self-directed learners.

Based on the after-school time released by the "double Reduction" policy, the school designs a stepwise growth path: the foundation level (mathematical modeling club, English Reading club) focuses on subject expansion; The advanced level (" Nanning Old Friends Cultural Digital Archive "project) focuses on interdisciplinary integration; The high level (science and technology competition, entrepreneurship simulation) focuses on innovation and practical ability to meet diverse development needs.

The ultimate goal is to cultivate core competencies. Students develop data analysis and logical reasoning skills through community research (designing questionnaires, analyzing data); Integrate knowledge through interdisciplinary projects to solve problems and enhance innovation and systems analysis skills; Enhance communication and citizenship through social practice. This ecosystem that integrates subject learning, social practice and interest exploration lays the foundation for adapting to the future society.

4. Conclusions

In response to issues such as the lack of autonomy among high school freshmen and the poor effectiveness of stratified teaching in the context of "double reduction", this study proposes an integrated solution of "big data precise stratified teaching management" and "home-school-community collaborative education". The results show that the Runjian system improves teaching accuracy through dynamic diagnosis and personalized matching; Home-school-community collaboration stimulates intrinsic motivation for learning, cultivates self-management ability, and provides an operational path for deepening the "double reduction" policy in the high school stage. The theoretical contribution of the research lies in constructing a dual-track framework of "technology empowerment + humanistic collaboration" to enrich the theory of stratified teaching and collaborative education. Practical suggestions: Teachers enhance data literacy and make good use of technology to optimize teaching; Schools strengthen home-school-community collaboration to form a joint force for education; Educational administrators focus on core competencies and push for reform of the evaluation system.

Future research could delve into three areas: refining the operational guidelines for collaborative models (such as standardizing parent training, community resource integration processes); Conduct cross-regional comparative studies to verify the applicability of the model; Explore the application of big data in long-term tracking of educational outcomes

(such as establishing digital growth profiles).

Disclosure statement

The author declares no conflict of interest.

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