

Research on the Strategies of Satisfying Students' Individualized Learning Needs in Curriculum Education

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ABSTRACT

This study focuses on how to meet students' individual learning needs in curriculum education. Through the in-depth analysis of the connotation and theoretical basis of personalized learning, this paper elaborates the individualized differences of students in cognitive style, interest, learning ability and learning progress. Then, a series of strategies to meet the needs of personalized learning are proposed, including accurate diagnosis of learning situation, hierarchical teaching, rich and diversified teaching resources, personalized learning path planning and effective learning evaluation and feedback mechanism. At the same time, it also discusses the transformation of teachers' roles, the role of technical support, the challenges and countermeasures in the process of implementing these strategies, aiming at providing theoretical basis and practical guidance for improving the quality of curriculum education and promoting the all-round development of students.

KEYWORDS

Curriculum education; Personalized learning; Demand satisfaction; Teaching strategy

1 Introduction

In today's education field, meeting students' individual learning needs has become an important goal of education reform and development. The document "China's Education Modernization 2035" promotes China's "vital educational concept that education modernization development should be taught in accordance with aptitude", and will "accelerate the pace of education modernization reform in the information age, accelerate the use of modern technology to promote the transformation of talent training mode." To realize the organic combination of large-scale education and personalized training "is a major educational strategic task"^[1].

Personalized learning aims to enable learners to obtain appropriate learning methods and learning resources according to their learning ability, cognitive level and knowledge state^[2], which has long been one of the goals pursued by teaching activities. The new education concept in the "Internet +" era requires educators to pay attention to students' personalized learning and development^[3].

With the diversification of society and the rapid development of information technology, students show increasingly significant differences in knowledge acquisition, learning styles and interest preferences. The traditional "one-size-fits-all" curriculum education model has been difficult to adapt to the learning needs of different students, and can not fully tap the potential of each student. Therefore, in-depth research on how to meet students' individual learning needs in curriculum education has extremely important practical significance, which helps to improve the pertinence and effectiveness of education and teaching, stimulate students' learning enthusiasm and initiative, and lay a solid foundation for cultivating high-quality talents with innovative spirit and practical ability.

2 Connotation and Theoretical Basis of Personalized Learning

2.1 Connotation of Personalized Learning

Personalized learning is a student-centered learning concept, emphasizing respect for the uniqueness of each student, according to the individual differences of students, including cognitive level, learning style, interests, hobbies, learning motivation, tailored learning goals, content, methods and evaluation methods.

It aims to enable each student to fully develop in the learning field and way they are good at, and maximize the learning benefits, not only the accumulation of knowledge, but also the improvement of students' comprehensive literacy and the sound development of personality.

2.2 Theoretical Basis

The "Multiple intelligences theory" was first published in Howard Gardner's landmark book "The Structure of Intelligence" in 1983. This theory is significantly different from the traditional concept of intelligence. It subverts the single intelligence view held by traditional intelligence theories and redefines intelligence^[4]. Gardner defined intelligence as

"the ability of an individual to solve or produce problems and products that are valued by one or more cultures or environments."^[5] Each student's performance and development level in these aspects of intelligence are different, which provides a strong theoretical support for personalized learning. The theory of multiple intelligencies does not rely solely on test scores to judge human intelligence, but focuses on the ability to solve practical problems and the ability to innovate^[6]. That is, education should pay attention to the cultivation of students' different intelligences, evaluate students from multiple perspectives, find students' intelligence advantages, and strengthen their strengths through appropriate educational methods^[7], so as to promote the harmonious development of all kinds of intelligences so as to promote all-round development.

Constructivism emphasizes that learning is a process in which students actively construct knowledge. In The constructivist learning model, RE Yager^[8] proposed that constructivism is "a most promising of learning". In his A unifying theme in science education, RH Yeany argues that constructivism "allows people to gather ideas and generate new ideas"^[9]. Based on existing experiences and cognitive structures, students constantly construct new knowledge in interaction with the environment.

In personalized learning, it means to fully consider students' original knowledge base and experience, provide them with personalized learning situations and resources, guide students to explore and construct knowledge independently, and make learning more in line with students' cognitive laws.

3 Difference Analysis of Students' Personalized Learning Needs

3.1 Cognitive Style Differences

Students' cognitive styles can be roughly divided into visual, auditory, kinesthetic and so on. Visual learners are sensitive to visual information such as images, colors and text, and they are better at learning by reading, viewing pictures and charts. Auditory learners have better perception and memory of sounds and languages, and like listening to explanations, stories and music to assist learning. Kinesthetic learners tend to understand and master knowledge through physical activities and practical operations, and learn better in sports. For example, when learning about historical events, visual learners may be impressed by historical maps and pictures, auditory learners may be better able to remember details of stories told by teachers, and kinesthetic learners may have a deeper understanding in role-playing activities that simulate historical scenes.

3.2 Differences in Interests and Hobbies

Different students have a wide variety of interests, and these interests can significantly affect their focus and enthusiasm in the course. Some students are enthusiastic about scientific experiments and are more inclined to participate in experimental inquiry in science courses. Some students love literary creation, and have a higher commitment to writing and reading literary works in the Chinese course; Other students are interested in performing arts and are active in their art classes. For example, in a biology course, a student who enjoys outdoor activities may be more interested in field biological observation and ecological research, while a student who enjoys exploring the microscopic world will focus on cell structure and microbial experiments.

3.3 Differences in Learning Ability

There is a big gap in the learning ability of students, including the speed of learning new knowledge, the depth of understanding, and the ability of knowledge transfer and application. Students with strong learning ability can quickly master new knowledge, conduct in-depth thinking and solve complex problems, and flexibly apply the knowledge to different situations; Students with lower learning ability may require more time and assistance to understand basic concepts and have more difficulty in applying knowledge. For example, in mathematics courses, students with strong learning ability can easily understand abstract mathematical formulas and carry out complex calculations and reasoning, while students with weak learning ability may need repeated practice and guidance in understanding the meaning of formulas and simple calculations.

3.4 Differences in Learning Progress

Even in the same grade, the same class, the learning progress of students is not the same. Some students learn faster, are able to complete the course tasks ahead of time, and are eager to expand deeper knowledge; Some students may, for various reasons, progress more slowly and need more time to consolidate the basics. For example, in an English class, some students may already be able to read the original English fluently, while others are still struggling with basic

vocabulary and grammar knowledge.

4 Strategies to Meet Students' Personalized Learning Needs

4.1 Accurate Learning Diagnosis

Use a combination of assessment methods, such as standardized testing, classroom performance observation, homework analysis, student self-assessment and mutual assessment. Standardized tests can show students' mastery of knowledge and cognitive level; Classroom performance observation can find students' learning attitude, participation, thinking activity, etc. Homework analysis is helpful to understand students' ability and deficiency in knowledge application and problem solving. Student self-assessment and mutual assessment can promote students' self-reflection and mutual learning. For example, in the Chinese course, students' writing ability is analyzed through composition correction, their thinking and expression ability is observed through class group discussion, and students are allowed to self-evaluate reading gains and mutual evaluation of oral expression performance.

Information technology is used to collect all kinds of data in the learning process of students, such as the learning time of online learning platforms, the correct rate of answers, and the browsing history of resources. Data analysis algorithm is used to mine the information behind the data, draw the learning portrait of students, and accurately locate the learning advantages, weaknesses and learning needs of students. For example, on the mathematics online learning platform, the error rate and repeated learning times of students in different knowledge points are analyzed to determine the math concepts and question types that students need to focus on.

4.2 Hierarchical Teaching

According to students' learning ability and level, teaching objectives are divided into basic objectives, improving objectives and expanding objectives. The basic goal is aimed at the students with weak learning ability, focusing on the mastering of basic knowledge and the training of basic skills; Target for intermediate level students, on the basis of consolidating basic knowledge, pay attention to the deepening of knowledge understanding and simple application; Development goals are set for students with strong learning ability, encouraging them to make comprehensive use of knowledge, cultivate innovative thinking and explore across disciplines.

For example, in physics courses, the basic goal is to enable students to understand basic physical laws and formulas and be able to perform simple calculations; The goal of improvement is to use physical knowledge to solve common problems in real life; The expansion goal is to guide students to explore cutting-edge physical science problems or carry out innovative design of physical experiments.

The teaching content is designed by layers to provide suitable learning materials for students of different levels. For students with weak foundation, provide simple and intuitive teaching content, such as simplified cases and detailed step descriptions; For middle-level students, the teaching content should be increased in difficulty and depth, and the construction and correlation of knowledge system should be emphasized. For advanced students, it provides challenging and open learning content, such as cutting-edge research results and complex practical problem cases. In chemistry, for example, the basic content can be the properties of common elements and chemical reaction equations; The middle level content is the discussion of the rules of the periodic table and the principle of chemical reaction; The expanded content is the synthesis and research progress of new chemical materials.

Different teaching methods are adopted for different levels of students. For students with weak learning ability, intuitive demonstration method and teaching method are used to help them establish clear knowledge representation and understand basic concepts. For middle-level students, it can be combined with group cooperative learning method and inquiry learning method to promote their thinking collision and independent learning ability; For high-level students, project-based learning and problem-oriented learning are adopted to encourage independent thinking, innovative practice and comprehensive use of knowledge. In the course of computer programming, teachers demonstrate programming steps and explain grammar rules for beginners. Arrange group projects for students with a certain foundation to develop a small program together; For programming experts, open programming problems are proposed, so that they can independently explore solutions.

4.3 Provide Rich and Diversified Teaching Resources

In addition to traditional textbooks, students are provided with a wealth of auxiliary teaching materials, reference books, academic journal articles, etc. These resources differ in content depth, breadth, perspective and so on, which can meet the learning needs of different students. For example, in history courses, in addition to textbooks, students are provided with works written by different historians about the same historical period, so that students can understand

historical events and people from multiple perspectives.

Use multimedia technology to develop digital learning resources, such as animated presentations, video explanations, virtual experiments, etc. Animated demonstrations can visualize abstract knowledge, video explanations can provide a more vivid teaching situation, and virtual experiments allow students to conduct experimental operation and exploration in a safe and low-cost environment. Taking electromagnetic induction phenomenon in physics course as an example, the relationship between magnetic field changes and induced current generation can be clearly demonstrated through animation demonstration; video explanation can be combined with electromagnetic induction application cases in real life; virtual experiment allows students to design experiments independently to explore the factors affecting induced current.

Build a personalized learning platform, integrate all kinds of teaching resources, and recommend appropriate learning resources for students according to their learning needs and progress. The platform can also provide learning tools, such as note-taking function, discussion area, knowledge questions and answers, etc., to facilitate students' learning and communication. For example, on the English learning platform, personalized English learning videos, articles, exercises, etc. are recommended for students according to their vocabulary, grammar level, listening, speaking, reading and writing ability. Students can record learning notes on the platform, discuss learning problems with other students, and ask questions to teachers or students with excellent performance.

4.4 Personalized Learning Path Planning

Different learning paths are planned for students according to their learning goals. If the student's goal is to improve the test score, the learning path can focus on the knowledge point sorting, typical question type exercises and mock tests; If the goal of students is to develop their interest and literacy in the subject, the learning path can include reading the subject classics, participating in the subject interest group, and carrying out extra-curricular inquiry activities. For example, in the geography course, students who want to improve their test scores can systematically review the textbook chapters in order, with a lot of map filling and exercises; Students who want to learn more about geo-culture can follow the World geo-cultural Heritage trail, read geo-cultural books, watch documentaries, and conduct field trips or online research.

In the process of learning, according to the diagnosis results of learning situation and learning progress, the learning path is dynamically adjusted. If it is found that students have difficulty in mastering certain knowledge points or skills, adjust the learning content and methods in time, and increase related learning resources and exercises; If the student shows a high level of talent and interest in a certain area, further expand and deepen the learning path in that area. For example, in mathematics learning, if students have difficulty in learning functions, adjust the learning path to add examples of function concept explanation, function image drawing exercises, and arrange more tutoring time; If students have a strong interest in geometric proof and perform well, guide them to learn more advanced geometric theorems and proof methods, and recommend relevant math competition resources and activities.

4.5 Effective Learning Evaluation and Feedback Mechanism

The method of teacher evaluation, student self-evaluation and student mutual evaluation is adopted. Teacher evaluation comprehensively evaluates students' learning results and learning process from the professional perspective; Student self-assessment can promote self-reflection and self-management, so that students can understand their own learning progress and shortcomings; Student evaluation is helpful to develop students' ability of critical thinking and cooperative learning. In art courses, teachers evaluate students' artistic skills and creative expression. Students self-rated their creative ideas, skills and efforts in the process of painting; Students can evaluate each other to find the advantages and improvements of the work from different perspectives.

Use process evaluation and terminal evaluation in combination. Process evaluation focuses on students' performance in the learning process, such as class participation, homework completion quality, project completion, etc. The final evaluation focuses on the assessment of students' learning outcomes, such as exam results and work display. For example, in the music course, the process evaluation includes students' singing performance in class, learning notes of music theory knowledge, participation in music group activities, etc. The final evaluation is the student's personal singing or performance assessment and the presentation of music creation works at the end of the semester.

Provide personalized feedback to each student based on their evaluation results. The feedback content not only includes the evaluation of the learning results, but more importantly, puts forward specific improvement suggestions and learning strategy guidance for the deficiencies of students. For example, in the evaluation of Chinese writing, for students with chaotic writing structure, the feedback suggests that they should learn the structure and layout of excellent model essays and carry out writing outline training; For students with plain language expression, it is recommended to read beautiful literary works, accumulate good words and sentences and imitate writing exercises.

5 Key Elements in Strategy Implementation

5.1 Change of Teachers' Roles

Teachers are no longer simply instilling knowledge to students, but guiding students to explore knowledge independently, and providing guidance on learning direction and methods according to students' learning needs and characteristics. For example, in science courses, teachers no longer explain each experimental step and conclusion in detail, but guide students to ask questions, design experimental schemes, observe experimental phenomena, analyze experimental data and draw their own conclusions.

Teachers should change from leading curriculum teaching to promoting students' learning, create good learning environment and conditions for students, organize learning activities, and stimulate students' learning interest and motivation. For example, in the Chinese class, teachers can organize poetry recitations, literary creation competitions and other activities to promote students' love and participation in Chinese learning.

Teachers need to integrate various teaching resources, including teaching materials, reference materials, digital resources, etc., to screen and reorganize according to students' individual needs, so as to provide students with the most suitable learning resource package. For example, in information technology courses, teachers integrate different software tutorials, online learning platform resources, actual project cases, etc., to provide personalized information technology learning resources for students at different levels.

5.2 Functions of Technical Support

Use the learning management system to manage students' learning process, including course arrangement, learning progress tracking, homework assignment and correction, score statistics and analysis. Teachers can learn about students' learning situation in time through the learning management system, and students can also view their own learning tasks and achievements in the system, and adjust their learning plans. For example, in the online course platform, the learning management system automatically records students' learning time, video viewing times, homework submission time, grades and other information to provide data support for teachers and students.

Intelligent tutoring tools such as intelligent learning robots and adaptive learning software can provide personalized tutoring according to students' learning conditions. Intelligent learning robot can answer students' learning questions and provide ideas and methods to solve them. The adaptive learning software can dynamically adjust the learning content and difficulty according to the students' answers. In mathematics learning, intelligent tutoring tools can analyze students' wrong questions in detail, recommend similar questions to consolidate exercises, and help students overcome learning difficulties.

With the help of data analysis technology, the rules and needs behind students' learning data are deeply explored, which provides a basis for the formulation and adjustment of teaching strategies. Through cluster analysis and association analysis of students' learning data, students' learning patterns, interest preferences and potential problems can be found. For example, in English learning, data analysis is used to find the differences in the effectiveness of certain vocabulary memory strategies, which can provide references for teachers to adjust teaching methods and provide personalized learning suggestions for students.

5.3 Challenges and Countermeasures

Personalized learning will encounter many challenges in the implementation process. For example, in order to meet the personalized learning needs of students, teachers are required to conduct more learning situation analysis, teaching resource integration, learning path planning and personalized tutoring, which will undoubtedly greatly increase the workload of teachers, may lead to insufficient energy of teachers and affect the teaching quality. In some areas and schools, education resources are limited, and it is difficult to provide rich and diversified teaching resources to meet the personalized learning needs of students. In particular, some remote areas may lack digital learning resources, advanced teaching equipment and professional teacher resources. Some students have weak independent learning ability. Even if personalized learning paths are planned for them and rich learning resources are provided, they may not be able to effectively conduct independent learning and still rely on the direct guidance of teachers. Personalized learning emphasizes respect for students' individual differences, which makes traditional uniform evaluation criteria difficult to apply. It is a difficult problem how to formulate the evaluation criteria that can reflect the individualized learning results of students and have certain comparability.

In terms of countermeasures, we should strengthen teacher training, improve teachers' educational technology ability and personalized teaching ability, so that teachers can carry out personalized teaching work more efficiently. At the same time, it advocates teamwork among teachers to share teaching tasks, such as teaching guidance for students at different levels and development of teaching resources. Through the sharing of educational resources through the network

platform, developed areas and high-quality schools can share excellent teaching resources to remote areas and weak schools. Strengthen regional cooperation in education, carry out teacher exchanges, distance learning and other activities, and narrow the gap in regional education resources. In the course of education, emphasis is placed on cultivating students' autonomous learning ability, and starting from the lower grade, students are gradually guided to learn to formulate learning plans, choose learning methods, self-monitor the learning process and self-evaluate the learning results. For example, to carry out learning methods guidance courses, learning strategy training activities. Establish a diversified, multi-level personalized evaluation system, taking into account students' learning process, learning outcomes, progress, learning attitude and other factors. The method of qualitative and quantitative evaluation is adopted, such as the combination of grade rating and comments, the combination of works display and examination results, so that the evaluation results can not only reflect the personality characteristics of students, but also make horizontal comparison to a certain extent.

6 Conclusion

It is an inevitable trend of education development to meet students' individual learning needs in curriculum education. Through in-depth understanding of the connotation and theoretical basis of personalized learning, detailed analysis of students' differences in cognitive style, interests, learning ability and learning progress, a series of strategies including accurate learning situation diagnosis, hierarchical teaching, rich teaching resources, personalized learning path planning and effective evaluation and feedback are proposed, and the key elements of strategy implementation are discussed. Such as teacher role change, the role of technical support and the measures to cope with challenges. However, in the actual implementation process, there are still many difficulties, and it is necessary for educators, schools, society and other parties to work together, constantly explore and innovate, in order to gradually build a perfect personalized curriculum education system. Only in this way can we truly promote the full development of every student in the course of learning, achieve the dual goals of educational equity and quality improvement, and lay a solid foundation for training innovative talents to adapt to future social development. In the future research and practice, it is necessary to continue to pay attention to the updating and iteration of educational technology, further optimize personalized learning strategies and methods, and deeply tap the potential of students, so that curriculum education can better adapt to the individual needs of students, and always maintain vitality and adaptability in the dynamic changing educational environment, so as to contribute to the progress of the entire educational cause.

References

- [1] The CPC Central Committee and The State Council issues China's Education Modernization 2035[N]. People's Daily, 2019-02-24(001).
- [2] Luo Xianzeng. Research on knowledge tracking and learning resource recommendation model for Personalized learning[D]. Jiangxi normal university, 2023.
- [3] Yuan Fang. Research on Influencing Factors of personalized learning effect of Middle school students in Blended teaching[D]. Northwest normal university, 2023.
- [4] Howard Gardner, 2013, The Structure of Intelligence, Zhejiang People's Publishing House.
- [5] Howard Gardner, 1999, Multiple Intelligences, Xinhua Press.
- [6] Shen Zhilong, 2009, The Emergence, Development and Prospect of Multiple Intelligences Theory, Jiangsu Educational Research, No.9.
- [7] Yao Qingchun, Yi Shenjun, 2008. Discussion on Classroom Ecology from the Perspective of Educational Ecology. Journal of Tianjin Normal University, No. 1.
- [8] R E Yager. The constructivist learning model[J]. Science Teacher, 1991, 58:52-57.
- [9] Yeany R H. A unifying theme in science education[J]. 1991.