

More Than Ten Years of Theoretical Research and Practical Exploration of Children's Comprehensive Intelligence Based Bilingual Education

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Abstract. At the threshold of 21st century, the new industrial revolution characterized by artificial intelligence has show rapid emergence, and the world has entered a new stage of human development. In order to solve the problems in Chinese bilingual education that do not adapt to the transformation of the times, the international cooperative comprehensive intelligence teaching experiment research team has carried out experiments in different schools in different regions and different levels since 2001. Taking Haibei Primary School in Nanhai District as an example, this paper discusses the theoretical research and practical exploration of comprehensive intelligence based bilingual teaching experiment in the past 11 years. On the basis of summarizing the results of various experiments, a new educational model is established to develop students' intelligence and cultivate high-intelligence talents for the intelligent era. The teaching results can be copied and popularized, which has a positive impact on other schools participating in the experiment.

Keywords: comprehensive intelligence English, teaching reform, talent cultivation

1. Proposal of the problem

To meet the urgent needs of China's educational reform and development, we should cultivate the high-tech talents urgently needed in China to achieve the goal of "*Double Reduction*", further promote educational reform, abolish bad practices, and keep the integrity and innovation, so as to promote the great rejuvenation of the Chinese nation. In view of the economic construction deployment of the "Belt and Road" initiative, the "*Free Trade Zone*" and the "*Guangdong-Hong Kong-Macao*" *Greater Bay Area* proposed by the CPC Central Committee, the country has put forward urgent needs to cultivate "modern people who can tell China's story to the world".

"Comprehensive intelligence English teaching model" focuses on solving three problems: (1) Dumb English for a long time. Students learn English for more than ten years, they still can not speak fluent English despite long time efforts and heavy burden. (2) Foreign language education system and subject teaching problems. To explore the comprehensive curriculum, integrate the knowledge of each subject and the essence of national culture, so as to stimulate the mind and reduce the burden, and create a foreign language teaching model in line with the primary school. (3) How to build a foreign language teaching model in primary schools and cultivate modern people who can tell Chinese stories to the world. Combining language learning with relevant subject knowledge and national culture learning is conducive to reducing burden and enhancing intelligence, cultivating students' core English literacy and cultivating patriotic sentiments and modern people who can participate in international competition.

2. Process and method of solving the problem

This experiment will carry out curriculum reform, set up new bilingual courses, achieve the goal of "Double Reduction", improve the quality of students, and strive to achieve the goal of all-round development. In order to solve the above problems, Haibei Primary School takes the following measures.

2.1. Literature research: Exploration on the theoretical basis of language education

Language is the foundation of all subjects. Children's knowledge and understanding are not only expressed through language, but also formed through language, that is, knowledge is constructed through language.[1] (1) The physiological theoretical basis of the teaching of comprehensive intelligence English: The study of brain lateralization, Lunneberg's concept of the critical period of language acquisition can enable the philosophy of comprehensive intelligence English to be adopted for emphasizing that children should start learning foreign languages as early as possible. (2) Theoretical basis of linguistics: Acquisition theory, holistic language teaching theory, language input hypothesis can be utilized to guide the formation of comprehensive intelligence English thematic activities teaching model. (3) The internalization theory of psychology, the hidden curriculum function of pedagogy, and the interactive practice principle of sociology lay a profound theoretical foundation for the experiment, which supports the practical exploration of comprehensive intelligence English teaching model in Haibei Primary School.

2.2. Action practice method: Construction of scientific research team and improvement of teachers' quality

The research team was made up of elementary school and university professors with the guiding principle of the introduction of experts, training teachers, in-depth practice. In 2011, Haibei Primary School guided the teaching mode reform of Haibei Primary School by the expert research group of "Comprehensive Intelligence English" from Nanguo Business School of Guangdong University of Foreign Studies. Well-known bilingual education experts from Guangdong University of Foreign Studies Nanguo Business School and other universities are invited to guide the backbone English teachers of Haibei Primary School, establish a tutor system, and carry out all-round training. Regular on-site lectures, comments, reflections and summaries were carried out to ensure online breadth and offline temperature, and practical exploration of comprehensive wisdom English teaching model was popularized in all 37 classes of the school. At the same time, there are special teacher training and teaching seminars every year.

2.3. In-depth research: reform of English teaching methods and implementation of comprehensive English courses

Comprehensive intelligence English advocates subject knowledge + English theme, and carries out experiential and inquiry-based interdisciplinary learning, so that students can learn knowledge of various subjects as well as the English language to achieve the multiple goals of constructing subject knowledge through English, developing language through subject knowledge, generating intelligence from comprehensive intelligence, and improving ability.

Comprehensive English emphasizes comprehensive language environment and teaching methods as the key to seeking the best results. On the basis of comprehensiveness, the new teaching for the purpose of development is realized, and comprehensive full-scene real language teaching is implemented so as to realize the innovation of curriculum and teaching form, that is, to adhere to the basic principle of bilingual teaching and teach in English and to create a teaching form that integrates multidisciplinary knowledge, national cultural essence and diverse means.

(1) Advocate the comprehensive use of a variety of teaching methods, teaching materials and teaching environment.[2] Pay attention to language integrity and holographic teaching, and provide similar novel situations in various aspects to enable students to perceive relevant things and vocabulary as a whole, so as to form an effective acquisition process.

(2) Promote English learning as the main axis of the comprehensive curriculum that integrate the knowledge of a variety of subjects and the essence of national culture so as to comprehensively develop students' language ability. Combine learning encyclopedia knowledge with language core literacy and national values.

(3) Make students to be fully engaged in the teaching situation, and to perceive language from many aspects in a diverse teaching environment, and to develop language in the use of language.

(4) According to the "gap" between classroom communication and practical application in English education, create opportunities for use after class, and switch from reading words first to carrying out activities. First, arouse learning needs through activities and drive classroom teaching. Combine the application of "in learning" with that of "in practical life" so that students can get the best language learning effect.

While focusing on listening and speaking and taking the lead in listening and speaking, we should properly integrate English listening, speaking, reading, watching, playing, writing and "doing" to strengthen the holographic stimulation of language and enhance the effect of language acquisition from different aspects. The English class will become a whole process, the dismembered knowledge integrated as a complete system to teach students. It lasted 11 years and persisted in carrying out action research from point to line to surface. It is widely carried out in 37 classes of the whole school, which greatly improves the credibility of the experiment.

3. Main contents of the results

3.1. Incremental development of the "433" teaching mode and the "7655" teaching technology system

The main frame of the experiment is as follows (See Figure 1).

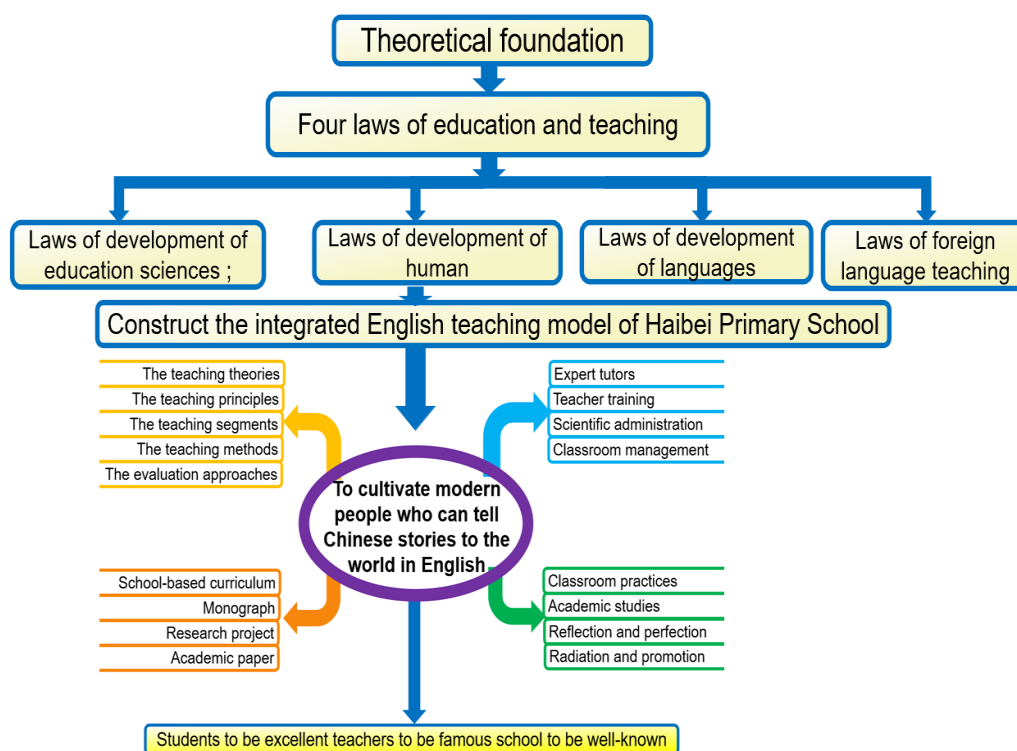


Fig 1. Haibei Primary School comprehensive intelligence English teaching model

3.2. Construction of the "433" teaching model of comprehensive intelligence English in Haibei Primary School

(1) Follow four laws: The laws of scientific development of education, the laws of human development, the laws of language development, and the laws of foreign language teaching.

(2) Three main methods are advocated: Early development and cultivation of interest, English teaching with focus on ability, and integration of encyclopedia potential acquisition.

(3) Achieve three effects: The early development of human potential, foreign language ability, the effect of accelerated development of children's thinking, and strive to achieve the three goals of

cultivating eugenic students, the growth of teachers, the development of famous schools. (See Figure 2)

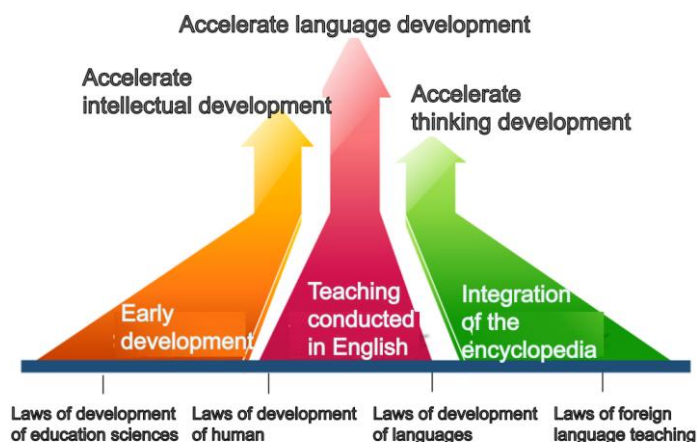


Fig 2. Comprehensive bilingual 4-3-3 teaching model

3.3. Establishment of the "765" teaching technology system of comprehensive intelligence English

3.3.1 Seven teaching principles

The principle of thematic activity, the principle of organic combination of listening, speaking, reading, reading and writing, the principle of operational reinforcement, the principle of direct learning and potential acquisition, the principle of participation and undertaking with interest, the principle of practical teaching, the principle of high speed and large amount of information.

(1) The principle of thematic activity. That is, we insist on active teaching with theme as the main form. Firstly, it is activity. Teaching interprets the basic meaning of English through activities, so that students can learn in walking, moving, doing and acting.

(2) Top priority in listening and speaking with the principle of mutual interaction of reading. According to the laws of children's language learning, the comprehensive intelligence English teaching experiment adheres to the foreign language teaching practice of listening, speaking, reading, reading and writing.

(3) Principle of reinforcement of operability. That is, to create an environment, guide students to try to learn independently, teachers seize the opportunity to give positive reinforcement. By means of comprehension, trial and error, students can constantly correct pronunciation, practice language meaning, learn communication and develop language ability.

(4) The principle of direct learning and potential acquisition. The comprehensive intelligence English teaching experiment advocates that children should learn the target language directly without the teaching experience of other language mediators, and in the process of gradual and natural context teaching, they can subconsciously acquire a positive language sense and produce a perceptive language learning effect.

(5) The principle of starting with interest and participation. Comprehensive intelligence English teaching emphasizes the teaching should begin from the interest of children, provide plenty of interesting material to guide the student for participation, and the teacher should pay attention to students' interest, and guide the student to participate in the teaching process, and students should be encouraged to understand the meaning of the language in participating and assuming roles. Students are required to transform the external motivation into the conscious internal motivation when achieving success so as to stimulate the desire to learn English and cultivate the interest in learning.

(6) Practical teaching principles. In order to improve the use rate of English, students' English learning must be combined with real life. Learn the familiar first, the frequently used first, and the

easy to understand first. This can better guide students to use English to learn, quickly enter the language environment, improve learning efficiency.

(7) Principle of high speed and high density. In order to create a foreign language teaching environment, the teacher must provide teaching process with extensive teaching contents and fast rhythm, to reach the depth of knowledge with the breadth of knowledge, accommodate a large amount of speech information at a high speed, expand the use of speech to achieve the concentration of speech in classroom teaching, so that students have more opportunities to perceive speech.

3.3.2 Six teaching links

Activities, thematic activities, exploratory activities, extended activities, integrated activities, developmental activities.

(1) Activity. To present relevant materials, organize familiar activities, so as to make them positively to be related to the content of the lesson, for prepare-ration of teaching.

(2) Thematic activities. To guide students to participate in related activities and learn through exploring knowledge. The key words are first learned in pictures or intuitive ways, and then the theme activity series is carried out.

(3) Exploratory activities. Under the guidance of teachers, students are encouraged to start from similar topics and carry out related activities independently to further strengthen their language learning in another way.

(4) Extended activities. That is, on the basis of the above learning, students can freely play and use related language activities. Students should be guided to combine the previous learning content with the current content.

(5) Integrated activities. It is also known as coordination or reflective activities, teachers consciously repeat or organize related activities, reflect on the teaching content, and strengthen the students' well-spoken sentences.

(6) Developmental activities. Integrate all the teaching contents of this course and those previously learned to form a comprehensive language development and be careful to lay foundation for next class.

3.3.3 Five teaching methods

Intuitive method, game based method, trial and error learning method, implied learning method, free language method.

(1) Intuitive method. Visual teaching tools, physical objects or multimedia teaching equipment are used to show students rich, vivid, concrete and intuitive objects and actions for learning the corresponding language..

(2) Game based method. In the teaching, we pay attention to interesting teaching activities, and make use of interesting themed games that meet children's requirements, so that children can play relevant roles, experience and acquire language.

(3) Trial and error learning. To use various situations to organize corresponding activities, so that students can conduct dialogue. For learning. try to learn, through trial speaking, correcting, trying to speak again and then correct, and then get accurate speech. Research shows that children's language learning is realized through countless trials and errors, and its basic process is: "word-correct pronunciation - even sentence correct pronunciation - correct expression in different situations". These four stages are achieved by children through countless trial and error processes.

(4) Implied learning method. A variety of situations are used to introduce a large number of language dialogues into the vivid activities, so that students can subconsciously learn language in a lively, interesting, relaxed and happy atmosphere, and they will have the impulse to talk and speak English. There are three conditions for the implied learning method: Lively, interesting and orderly teaching situation; Relaxed and emotionally engaged teaching activities; A melodious classical note.

(5) Free language method. That is, setting up interesting language environment in teaching, guiding students to talk freely according to their own understanding, so as to obtain the greatest

psychological relaxation, in order to achieve the maximum language uptake rate and comprehensive synthesis effect.

4. Innovation teaching

In language teaching, from Chinese teaching to English teaching, we pay attention to the holography of teaching so as to achieve holographic stimulation in listening, speaking, reading, reading and writing; In terms of teaching mode, emphasis should be placed on learning new words first and stimulating activities first. Emphasis should be placed on teaching activity and thematic activity teaching. In the nature of teaching, emphasis should be placed on learning from vocabulary memory to global perception, on holistic learning, on using global perception, and on following the practice of pre-post-learning. In terms of teaching thought, it emphasizes from knowledge teaching to ability training, emphasizes the inquiry of teaching, and advocates learning in use.

5. Effect and reflections

5.1. Establishment of an advanced bilingual teaching model of "comprehensive intelligence and improvement of ability"

This result has created a set of domestic leading and international advanced bilingual teaching mode, which is unique in concept and form, and it changes the traditional exam-oriented teaching, and promotes the construction of famous bilingual teaching school in order to advocate a reform aimed at comprehensively absorbing the successful experience of international foreign language teaching[3]so as to seize the best time for children's language development. Through the comprehensive teaching resources in the whole English teaching, the design of teaching scenarios and the integration of various teaching methods and a variety of subject content can be used to stimulate students' independent learning, promote intelligent growth so as to obtain the best educational effect.

5.2. Promotion of the development of students' individual comprehensive quality

The experiment integrated human development, language development and foreign language teaching model. The teaching model of foreign language ability and the best way of English teaching in Chinese primary schools have been found, and the transformation of foreign language teaching model has been realized. In addition to the overall improvement of the core quality of English language, the students in comprehensive intelligence English based experimental class are cheerful, lively with complete personality and innovation.

Due to the characteristics of comprehensive teaching, students show advantages over others of the same age in listening, speaking, reading and writing ability, movement ability, living ability, basic knowledge, behavior habits and performance ability, and more importantly, the cultivation of critical thinking has been developed in a high quality. Professors from the University of Hong Kong, Secretaries to presidents of African countries, and researchers from the U.S. Department of Education all went to Haibei Primary School to have debates with students in English. Students in Haibei primary school have their own independent opinions, neither humble nor overbearing, and they can politely exchange their views and thoughts with guests.

5.3. Teaching mode promotes the rapid development of students' intelligence and lays a solid foundation for cultivating future scientific and technological talents

(1) Indicators and methods of intelligence test for children in Haibei Primary School (see Table 1).

Table 1. Dynamic comparative studies

Multi-index		Multiple methods
Cognition (intelligence) IQ \leq 20	Thinking Perception Memory	Cognitive experiment Intelligence test
Creativity 20 \geq IQ \geq 20	Creative thinking Creative imagination Creative problem solving skills	Creative Thinking test Tests of divergent thinking Creative imagination test Creativity Questionnaire
Learning ability IQ \leq 20	The speed, manner, depth, and consolidation of knowledge	Tests of learning ability and success Observation of the learning process Job analysis
Specific ability 20 \geq IQ \geq 20	Bilingual speech and debate, leadership, painting, calligraphy, music	Special ability tests Product (operation) evaluation Observation
Personality characteristics IQ \leq 20	Curiosity for knowledge, Confidence, persistence, etc	Questionnaire, observation, educational experiment

(2) Intelligence test results (See Table 2).

Table 2. Intelligence Test results

Grade	The number of students	Average IQ	Description
Grade 1	251	57.62.	During the first and second grade learning, the children's intelligence is in the stage of normal development and accumulation, and the accelerated development of intelligence appears after the third grade. An accelerated burst of intelligence can occur in fourth and fifth grade, with most children stimulated by imagination and creativity. Students in the sixth grade have formed good logical thinking ability and critical thinking ability.
Grade 2	249	59.88	
Grade 3	249	72.03	
Grade 4	256	83.21	
Grade 5	262	99.79	
Grade 6	262	121.32	

5.4. Wide influence and strong social influence

The "Comprehensive intelligence English teaching model" aims to cultivate modern people who can tell China stories to the world. It has made a significant impact both at home and abroad, benefiting 1,576 students in our school and about 6,000 students in other schools. It has influenced more than 2000 teachers and educational researchers in language teaching.

On July 12, 2018, China Education News published an article about the teaching results of this teaching titled "Cultivating modern people who can tell china stories to the world".

5.5. Reflections on practice improvement

To keep abreast with the times in teaching idea, method and contents, The "Comprehensive intelligence English teaching model" is also required to pay attention to the development of the society

with close eyes on the forefront of international and domestic education theory and knowledge, so as to constantly, and continuously explore better teaching methods to adapt to the new situation. As a result, it can be a place to give full play of their interests, which can also be the carrier of students' creative thinking. Only in this way can our textbooks be live, so that our learning can be diversified and interesting, and our teaching methods full of entertainment and thus laying a solid foundation for the lifelong development of students.

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