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RESEARCH ARTICLE

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China's New National Curriculum Reform: Innovation, challenges and strategies

Abstract This paper presents systematically China's New National Curriculum Reform (CNNCR). It covers the background, origin, essence, goals, features, evolvement, schedule, implementation, the alignment in primary, secondary and middle schools' curricula and inter-subjects, the outcomes and the challenges and strategies of CNNCR.

Keywords China's New National Curriculum Reform (CNNCR), innovation, challenges and strategies, compulsory education

摘要 本文系统地论述了中国新课程改革，包括新课程改革的背景、起源、本质、目标、特征、发展、进程、执行，在小学、初中和高中课程的分布，新课程改革的成果、面临的挑战以及未来的战略。

关键词 中国新课程改革 (CNNCR)，创新，挑战与战略，义务教育

1 Introduction

China's New National Curriculum Reform (CNNCR), to some degree, is an important moment for curriculum theory as it has not only moved curriculum

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beyond traditional prescriptions as outlined by Morrison (2004), but has also moved beyond Pinar and Grumet's (1976) "interpretivist" approach. Lather (2004) stated that it is time to "turn toward more concrete efforts; put theory to work". In other words, it is time to call upon educational researchers to get to understand that the way they know and what they know also impact the lives of those they study and/or teach.

Morrison (2004) in his article entitled "The poverty of curriculum theory: a critique of Wraga and Hlebowitsh" addressed the need for new, open-ended curriculum theories that move beyond the historically inscribed limitations outlined again and again by Wraga and Hlebowish. In response to Morrison's (2004) call for new curriculum theory and a larger scene of the curriculum field, especially the debates of the last decade (Short, 1991; Graham, 1992; Morrison, 2004; Pinar, 2004; Reynolds and Webber, 2004), dominant and liberal reform discourses in contemporary school reforms tend to instrumentally organize change as logical and sequential, although there has been some recognition of the pragmatic qualities of social life. Although the specific focus may change, the agents of redemption are the State and educational researchers, and the agents of change are teachers (Popkewitz and Marie, 1998). All in all, in order to further improve the theory and practice of curriculum reform in China, the following will take a systematic review on CNNCR.

2 Background of CNNCR

2.1 Social and political background: Relevant national policies and measures

Since 1985, China's economic system has been transitioning from a planned economy to a market one. China's political system has been initiating a progress from centralization of state power to local democracy and autonomy diversification. These economic and political system changes have prepared a proper climate for educational reform from a traditionally rigid and closed system to a flexible and more open one. The reform in education, from theory to practice, has been accelerated. Among the innovations, the first that deserves to be mentioned here is the dynamic national curriculum reform.

There have been three motivations for the implementation of a new curriculum reform. First, the international competition is becoming fiercer. Creative talents play a key role in determining the ultimate success in an international setting. Especially with the expansion of the "knowledge economy", China's education is required to reform accordingly. Second, the rapid popularization of information technology and internet system has a great impact on instructional tools, classroom arrangements and delivery modes. This obviously changes the

traditional educational philosophy, educational concepts and the overall system of school management as well. Third, quality education focusing on all-round development, including physical and mental characteristics, highly demands to liberate students from their heavy learning burden generated from exam-oriented education.

To meet these demands, the State Council of China and the Third Conference of National Education issued the *Decision on the Reform and Development of Basic Education* in 1999. In early 1999, the State Council ratified the *Action Plan for Educational Vitalization Facing the 21st Century* formulated by the Ministry of Education (MOE). On the basis of it, MOE drafted and distributed the *Action Plan for Revitalizing Education for the Period of 2003 to 2007* in 2003. Both of these documents initiated and reinforced the reform of the existing curriculum system. CNNCR has expanded from its initial experiments in some districts at the primary levels since the beginning of this century up to now (2006), which includes the primary and secondary schools at all levels through the whole nation.

2.2 Educational background: Main problems existing in education per se

2.2.1 Traditional notion of curriculum is outdated

Any theory of curriculum must be based on a theory of what knowledge is and how it is gained, i.e. epistemology. According to Michael (1997), the traditional spectrum of epistemological positions ranges from rationalism to empiricism and to constructivism. Rationalism holds that the human mind is capable of a direct apprehension of some empirical truths and that we in fact do have some knowledge of the real world that is in a certain way independent of experience. Empiricism holds that knowledge of the real world arises entirely out of experience. But newly prevailing constructivists insist that learner construction of concepts and principles through active experimentation is the primary way of learning. They argue that all knowledge is socially constructed; knowledge is not "out there" but is constructed in the mind of the knower. Truth is made, not discovered. In contrast, China's traditional curriculum was narrowed down to teaching materials compiled by editors according to the development of subjects, keeping students away from real experience. From the perspective of constructivism, the new era of China needs a new curriculum based on a new curriculum perspective.

2.2.2 Educational aims lacking a unified definition

As far as the educational aims are concerned, there are no clear stated definitions, such as "to cultivate laborers", "to cultivate successors and builders" and "to

cultivate fresh citizens of ideality, morality, culture, and discipline". These vague and variable definitions of educational aims cause the confusion of teaching objectives.

2.2.3 Configuration and content of traditional curriculum ignoring students' principal part and overall development

The content and curriculum design of compulsory subjects could be described as "spoon-fed" to students. It overlooks students' learning habits, practical skills in real life experience and healthy views towards life. The traditional delivery mode is teacher-centered, classroom-disciplined and textbook-oriented. It reflects little of inquiry-based, research-based, task-based, exploratory, communicative, cooperative, active-involved/engaged means of instruction.

2.2.4 Inflation of educational content

Traditional educational content is really like an encyclopedia based on various disciplines. The content is gradually becoming increasingly outdated so that what is learned at school is far from what is really needed in reality. Moreover, the amount of information that students are expected to learn in order to compete internationally is increasing exponentially. The only result caused by this phenomenon is that students and teachers have become overloaded.

2.2.5 Instruction and methodology having been distorted

Essentially, methodology is a means to deliver the curriculum. But in traditional curriculum, methodology is distorted as aims; content is distorted as carrier to realize methodology. Spoon-feeding methods still dominate all levels of education, such as "morning exercises"—doing exercises in a large number over and over again; test taking—having simulated exams one after another; various remedial classes—make-up courses for those low grades students to achieve a higher academic performance in exams, etc. The results of these efforts are more negative than positive.

2.2.6 Curriculum evaluation being improper

In traditional curriculum evaluation, there exists a serious flaw. For instance, it only highlights the instrumental nature of evaluation rather than its practical effects, paying attention to the achievements regardless of diagnosis, attaching importance to the summative assessment instead of formative assessment, stressing quantitative evaluation while ignoring qualitative evaluation, and emphasizing one subject evaluation, not a comprehensive evaluation.

2.3 Diversity of education

In 1985, the Central Committee of the Chinese Communist Party issued the *Decision on the Reform of the Educational Structure* (abbr. *Decision*, 1985), laying down several principles that local governments should be responsible for issues regarding basic education. The new policy was an incentive for local governments, especially those of the counties and townships. The *Decision* also points out the triple classification of the educational regions in the country: developed regions, moderate developed regions and underdeveloped regions. In each of these three regions, different steps are taken to obtain the educational permeation at different timetables. In 1986, the National People's Congress promulgated the *Compulsory Education Law of the People's Republic of China* (abbr. *Law*, 1986), thus placing basic education in the country on a firm legal basis. In 1993 the CPC Central Committee and the State Council jointly issued the *Guidelines for the Reform and Development of Education in China*, clarifying the directions and basic policies for the development of basic education till the early years of the 21st century. In June 1999, the CPC Central Committee and the State Council jointly promulgated the *Decision on the Deepening of Educational Reform and the Full Promotion of Quality Education* (abbr. *Decision*, 1999), clarifying the direction for the establishment of a vital socialistic education with Chinese characteristics in the 21st century, which also stresses that every school-aged child has the right to enjoy compulsory education and the basic educational business is supervised by the central government, accounted for by the local governments and managed by each subordinate level of the educational bureau.

In *Decision* (1999), strong guidelines clearly indicate the necessity of readjusting and reforming the curriculum system, establishing a new one instead, and implementing the curricula on national, local and school levels respectively. The *Decision* also stresses the importance of the comprehensiveness and practicality of the curriculum in order to develop students' ability to operate. It is imperative to improve the diversity of the teaching materials and the assessment of those materials, in order to ensure the adaptability of the curriculum to the economic development of local areas, especially the rural and depressed regions of the country.

The following trends for the diversification of the education provide a context for CNNCR.

(1) Educational democracy: the society demands for a larger scope and a higher level of the educational equity.

(2) Educational multiplication: the multiplication of the educational system requires the framework to be multi-layered, multi-hierarchical, multi-representative and multi-standard. In the traditional highly centralized system, this multiplication is unattainable; but in the current situation, it is realistic.

(3) Educational socialization: if learning involves all one's life, in the sense of both time-span and diversity, and all of society, including its social and economic as well as its educational resources, then we must go even further than the necessary overhaul of "educational systems" until we reach the stage of a learning society (Faure, 1972). This learning society requires a radical change of the traditional educational forms and curriculum resources.

(4) Decentralization of educational management: the consequential outgrowth of the social structure is an appropriate combination between the national guidelines and local self-management. The corresponding strategic plan for the educational development is bound to be unbalanced due to a variety of alternations for the educational forms.

(5) Multiplication of school investors and administrators: China has basically formed a school-administrative system under which the government-run schools tend to serve as the mainstay with the participation of people from all walks of life and the joint development of schools run by the state and non-governmental efforts. However, in recent years, private investment has taken on a new trend into the educational managerial system featuring management at various levels.

(6) Educational internalization: as a result of globalization, the importance of information and communications technology (ICT) and rapid technological change, education is crucial for growth. An international-level education requires an open system for promoting a variety of training skills and various forms of learning. Medium term documents delineating strategies (1996–2001) and the two-year program (2000–2001) created by UNESCO indicate that the strategy to be adopted is to diversify the structures, to expand payment systems for services at a secondary level, to renew study programs and pedagogical methods, to use new information technologies, and to maintain ongoing efforts to eradicate inequalities between the various domains in education.

(7) Comprehension of the educational goals and knowledge: as the crucial stage of individual education, basic education plays a significant role in training talented students for higher education, vocational schools and various forms of labor resources. In order to overcome the challenges of the 21st century and to allow the secondary education to play a regulatory role in the overall system of education in promoting a variety of education, this sector should urgently be re-organized.

(8) Lifelong learning: what a student learns at school should pave a solid foundation for his professional and adult development. Since the 1980s, China's market economy has a high demand for talented and skilled people, which has a greater and more urgent need for the diversification of the educational curriculum framework in turn. So far, multifaceted experiments and studies have been carried out in order to bring forward a more reliable measure for this trend.

3 Origin, essence, goals and features of CNNCR

3.1 Origin of CNNCR

Decision (1999) put forward that in order to establish a new basic educational curriculum system, the traditional system's structure and curriculum content should be adjusted and changed. In 2001, the Chinese government convened a meeting on basic education on which the *Decision of the Reform and Development of Basic Education* was made. The decision insisted on the building of a new curriculum system that is focused on comprehensive development. Under the directions of the central government, Ministry of Education initiated the seventh national basic educational curriculum system reform.

3.2 Essence of CNNCR

According to the document issued by Department of Basic Education, Ministry of Education (1999), the Outline of Curriculum Reform of Basic Education is one of the pivot projects listed in *Action Plan for Educational Vitalization Facing the 21st Century*. It is an important step for China's basic education to be oriented towards modernization, the whole world and the future. Its essence is to establish a new curriculum system for basic education to meet the requirement of the 21st century, which fully reflects the essence of basic education and spirit of education for all-round development and secures students to become true masters of learning. The content of PONBECR covers: (1) general plan; (2) goals/objectives of curriculum; (3) standards of curriculum; (4) structure of curriculum; (5) compiling and management of teaching materials; (6) implementation of curriculum; (7) evaluation of curriculum; and (8) curriculum management.

3.3 Goals of CNNCR

3.3.1 Macro-goals

CNNCR set up the following educational goals: developing patriotic spirit, that is, to love their country; carrying on the fine cultural traditions handed from history; helping students stick to the socialist democratic system and strengthen the socialist legal system; helping students abide by the law of China and social public ethics; helping students foster the morally sound values and outlook on the world and life; helping students develop a sense of social responsibility and serve the people; cultivating students' spirit of innovation and creativity, practical ability and environmental awareness; helping students grasp basic knowledge and promote lifelong learning; protecting physical and mental health of students;

promoting students to become civilians who are moral and disciplined. These overall educational objectives embody the fulfillment of Deng Xiaoping's educational thoughts of the "Three Orientations" of basic education, that is, education must be modernized, must be international and must be progressive. Also, it is a concrete implementation of basic education tasks that is to strengthen the comprehensive power of the state by improving the quality of the whole nation.

3.3.2 Micro-goals

It is known that China is a big country with a large population and vast area with differences in economy and culture among regions. The traditional unified curriculum requirements apparently cannot meet the needs of students' development in diverse areas. Therefore, a new round of curriculum reform aims at founding an appropriate flexible management mechanism of three levels to keep both unification and diversification work effective.

The three-level curriculum management model can be described like this: the state is responsible for establishing a macro plan for curriculum development, deciding on categories of subject courses and their periods, issuing national standards for each course, and providing macro directions to the implementation. Local (provincial and lower levels) educational administrations, under the direction of national curriculum, lay out the project of implementation of curriculum to match the needs of local areas, for instance, localizing national curriculum, selecting teaching materials, building local instructional resource database, inspecting the process and assessing the result of curriculum reform, and so on. Schools are encouraged to explore and/or select curriculum and textbooks suitable for their own characteristics or needs, what is more, they are entitled to design their own school-based curriculum and compile textbooks. To put it in another way, this three-level curriculum management does not only embody the fundamental requirement of the state but also leaves time and space for the local development. For instance, in new curriculum program, some rights of curriculum development and management, such as selecting textbooks, rewriting school-based textbooks, even some tests, etc., are transferred to local administrations and schools. Therefore, the local educational administrations and schools should have more opportunities and enthusiasm to participate in the development and management of curriculum. This is both the basic guideline for this new curriculum reform and what CNNCR wants.

To realize these aims, CNNCR relocates the proportion of curriculum resources to three levels in the whole curriculum program by, for example, cutting short the part prescribed by the state. With a respect to curriculum content arrangement, a considerable flexibility leaves local administrations and schools much more

space to select or add selective courses. According to CNNCR, local and school curricula cover 10 percent to 12 percent in the whole curriculum period. This decision adapts to the lopsided development of economy and culture in China.

There is every reason to believe that the three-level curriculum management (national level, local level and school level) in curriculum implementation is an intelligent strategy to meet the specific needs of social, economic and cultural development among different areas in China.

3.4 Features of CNNCR

Compared with the previous curriculum reform, this reform stresses a revolutionary change in educational concepts: aiming at the favorable process of quality education by changing teachers' instructional modes and students' learning methods. Specifically, it has the following five main features.

(1) The educational function is transformed, and quality education is put into effect.

The new wave of curriculum reform aims at representing the three-part curriculum function: knowledge and skills; procedures and methods; and effect and attitudes. This "trilogy" will facilitate the all-round educational development.

(2) The "curriculum-centered" framework is broken through, and the curriculum integration is strengthened so as to establish a comprehensive curriculum framework.

Basic knowledge and skills required for lifelong learning are highlighted. Difficult, outdated and non-relevant contents are deleted. What is learned has a closer relationship with students' daily life, modern society and technology.

(3) The curriculum target is stressed and schools and teachers are provided with more autonomy to conduct the reform.

CNNCR emphasizes the target outline for different stages of education by providing suggestions for the implemental procedures. However, with respect to the content and methods leading to the target, especially the sequence to knowledge acquisition, CNNCR has no mandatory prescription. It provides much more flexibility for alternative teaching materials, and creative teaching and learning methods. This makes the curriculum standards distinguished from traditional teaching outlines.

(4) Priority is given to the achievement and improvement of learning methods and techniques. CNNCR emphasizes educational procedure, learning experience, teaching materials, instructional methods, evaluation and assessment, diverse learning methods (initiative participation, personal practices, independent thinking, cooperative inquiry) and students' all-round learning skills (information collecting and processing, problem-solving and analysis, knowledge acquisition, communication and cooperation).

(5) More effective evaluations and all-round development are highlighted.

CNNCR aims at proposing much more effective strategies and concrete evaluation instrument. The evaluation focusing on students' learning procedure facilitates students' all-round harmonious development.

4 Evolvement, schedule and implementation of CNNCR

4.1 Evolvement of CNNCR

Curriculum 2000 is the latest national curriculum document, which is the eighth wave of curriculum innovation since the foundation of the People's Republic of China in 1949. Its whole development has undergone three sequential stages: preparation, experiment and popularization. In June 2001, MOE issued the *Outline of Curriculum Reform of Basic Education* (*trial version*) *and Curriculum Standards of 18 Compulsory Subjects*. Since then, 38 counties from 27 provinces and/or municipalities (big cities directly administrated by the jurisdiction of the central government) have been designated as experimental bases for the curriculum reform of compulsory education. During this experimental stage, 49 experimental textbooks covering 20 subjects (seven for primary education and 13 for secondary education) were endorsed for the implementation on an experimental basis. According to MOE, by 2003 this experimental stage has lasted for three years.

In 2003, standards of subjects were emended on the basis of previous experiments, feed-back, surveys and studies. From 2004 to the fall of 2005, CNNCR began its full implementation in compulsory education and senior high school education. By the fall of 2005, all starting grades in the elementary and secondary educational stages have taken the new curriculum system. Hereby, the national regular new curriculum system adaptive to basic education requirement in the 21st century has come into being.

4.2 Schedule of CNNCR

In 1999, MOE organized experts to make a general plan and guideline for the curriculum reform of basic education. Meanwhile, new curriculum standards for Chinese, mathematics, foreign languages and computer technique were established.

In 2000, curriculum standards for the remainder of subjects in the compulsory education stage were completed. And the curriculum standards for senior high school subjects started its drafting plan and research. The first group of experimental regions was approved and partial curriculum standards were put into experiments.

In 2001, MOE issued the *Outline of Curriculum Reform of Basic Education* (*trial version*) *and Curriculum Standards of 18 Compulsory Subjects* (*experimental versions*), endorsed nearly one hundred editions of new curricular experimental textbooks under twenty subjects. *Experimental Blue Print of Subject Setting for Compulsory Education* and related documents were issued. The research achieved a break-through in curriculum planning, curriculum standards and related assessments, and compiling new teaching materials. Based on the research, MOE launched the basic educational curriculum reform in experimental districts at national level. CNNCR began its experimental implementation in 38 districts from 27 provinces and/or municipalities directly under the Central Government in September the same year, with emphasis on exploring the specific operative mechanism of three-level curriculum management, and the reform of evaluation and testing system.

In the fall of 2002, curriculum system (including operative mechanism of three-level management, evaluation system, and so on) for compulsory education moved forward into a new stage of nation-wide experiments. Each city opened a county-based experimental base at the provincial level. The number of elementary students participating in the experiments covered 10 percent to 15 percent of that from the whole nation. As a result, experimental bases extended to over five hundred counties (cities or towns), which accounted for 17 percent of the total counties in China. In the same year, curriculum standards of major subjects were completed and issued.

In the fall of 2003, subject-setting plans, curriculum standards of all subjects, guidelines for local and school curriculum management, evaluation and testing reform plan for primary and secondary schools were re-evaluated, amended and refined based on the experience and lessons drawn from experimental bases. Newly-developed teaching materials were inspected and endorsed. A larger scale of curriculum reform was initiated. The number of beginning grade students participating in the experiments covered 35 percent of the whole nation.

In the fall of 2004, CNNCR experienced a stage of popularization in compulsory education stage. Formal subject setting plans, curriculum standards for all subjects and other related documents for compulsory education were issued by MOE based on experience drawn from assessment on experimental bases at both national and provincial levels. The number of beginning grade students participating in the experiments covered 65 percent to 70 percent of the whole nation.

In the fall of 2005, in general, all beginning grade students in primary and secondary schools nationwide started to carry out CNNCR. Formal new curriculum plans, standards for all subjects and other related documents for high schools were issued by MOE.

In the fall of 2007, it is planned that CNNCR will be implemented in all high schools nationwide, entering a new stage of full-scale generalization in basic education.

4.3 Implementation of CNNCR

4.3.1 Principles

CNNCR criteria should be fundamental standards that most of the students can reach. It should be within most students' Proximal Developmental Zone.

CNNCR content and requirements in compulsory education should be fundamental, developmental, instrumental and beneficial to lifelong learning.

CNNCR should leave students enough time and space for their own diversified and sustained development.

4.3.2 Measures

It is necessary to change the tendency from overemphasis on knowledge to active learning attitude. Turn acquiring knowledge and skills into learning how to learn and form correct values.

A "diversified" curriculum structure is expected and isolated subjects need to be integrated. In the past, the curriculum standards were mandatory: the curriculum structure is the same at the same time of the year for all the same level of schools in the country. With the development of economy and education of China, this unitary feature could not meet the high demands of the graduates, for it seriously restrains the overall development of students. It is time for change. The diversity of the curriculum holds two implications. First, it means a variety of subjects. For example, there are two main types of subjects: academic subjects and activity subjects. The academic subjects contain major instrumental subjects (such as Chinese, mathematics and foreign language), subjects of natural science and social science and vocational subjects. In each type of subjects, there are mandatory or elective courses; long-term or short-term courses. Second, it means various proportion and weights of each subject among the different kinds of subject combination.

The category of subjects and the proportion of each subject should conform to their harmony, comprehensiveness and selectiveness. Some concrete ways are as follows: cutting down the number of subjects, reducing the proportion of language and literacy to 20–22 percent from 24 percent, and mathematics to 13–15 percent from 16 percent so as to save much more time for comprehensive practical activities and local courses and ensuring comprehensive practical activity course covering 6–8 percent of all periods, local and school based curricula covering

10–12 percent of all periods. As a result, the proportion of science and comprehensive practical activities ascends with these changes.

The management of curriculum is divided into three levels: national, local and school. To ensure that curriculum content has more local characteristics, local administrations and schools will be more active in adapting to their needs.

It is important to select basic knowledge and skills necessary for lifelong learning, such as English and information technology. The content of curriculum reflects students' life experience and fresh achievements of social, scientific and technological development.

It is necessary to lower the difficulty of content and create a moderate difficulty based on Proximal Development Zone. Supplement content closely related to students' life and society, for example, adding health care and mental health to physical education, adding social practice, community service, labor technology and exploring activities to comprehensive practical activities.

Importance is attached to students' major parts in curriculum. Students are encouraged to have active and creative learning instead of passive rote learning. The new reform makes it necessary to promote students' independent, exploring, discovering, cooperative and participant learning. What matters is the strategy of learning, not only the result of learning.

Comprehensive practical activities are implemented to extend students' learning space. Students are supposed to find and solve problems in such activities as doing, seeing about, experiments, exploration, design, manipulation, imagination, reflection, tasting, and so on. What is more, cultivating students' creativities, taking part in practical activities and developing students' social responsibility are needed.

It is advisable to take advantage of comprehensive curriculum to understand the problems by connecting isolated subjects, such as environmental problems, population problems, resources problems, etc. According to the new curriculum program, elementary schools enjoy a comprehensive curriculum. Subject-oriented courses required for primary grades in elementary school are: morality and life, Chinese, mathematics, physical education, art (music, fine arts). Subject-oriented courses required for higher grades in elementary school are: morality and life, Chinese, mathematics, foreign language, comprehensive practical activities, physical education, art (music, fine arts). Junior high schools also offer two categories of courses: one is subject-oriented; the other is comprehensive-oriented. Subjects-oriented courses are: moral character cultivation, Chinese, mathematics, foreign language, science (physics, chemistry and biology), history and society (or history, geography), physical education, art (music, fine arts). Senior high schools mainly offer required courses.

Curriculum resources are collected from both inside and outside schools. Teachers should lead their students to explore the curriculum resources, make students act as major parts and masters of learning. Therefore, a chapter of how

to explore curriculum resources is included in each subject course criteria. Teachers are given concrete advice on how to use these curriculum resources.

Administrators and "backbone", or master, teachers in experimental areas receive training as mentor teachers play a leading role in the implementation of CNNCR.

5 Alignment in primary, secondary and middle schools' curricula and inter-subjects

According to Zhu (2002), in *Compendium Act III*, it states "the need for the framework of *Nine-Year Compulsory Educational Curriculum* to provide a more coherent and integrated structure." There are four guidelines for this setup: (1) to reflect the basic nature of the *Nine-Year Compulsory Educational Curriculum*; (2) to comply with the characteristics of students' emotional and physical development; (3) to align with the demands for the social, economic, scientific and technological development; and (4) to lay a solid foundation for students' overall quality and lifelong development. Hereupon, the current reform stresses the "integrity" of the coherent nine-year-compulsory curriculum structure. In fact, this is the embodiment of the very three features of CNNCR designing ideas: equilibrium, comprehensiveness and alternativeness. The "integrity" refers to the cross-sectional organization of the curricula for all subjects. This integrative reorganization presupposes the individual differences of each subject, and eliminates the isolation or contradiction among different subjects. Therefore, all the integrated subjects can bring forth a resultant force, which facilitates the holistic learning effect for learners and promote their overall personality development. The "coherence" refers to the organization of all subjects based on its longitudinal sequence of development. As far as one subject is concerned, the content of each subject is deepened and expanded in the recurrent process of learning, and then consolidated and strengthened continuously. As far as all subjects are concerned, it is necessary to start with individual subjects in a well-planned order, hanging together one with another sequentially. Meanwhile, the numbers and kinds of subjects are increased from the lower grades to the higher grades, thus resulting in the accumulative learning effects accordingly and facilitating learners' sustainable development. All of these pursuits for alignment with lower grades and inter-subjects can be demonstrated clearly in detail by the subjects setting and proportion of periods (see Tables 1 and 2).

In addition to subjects design and appropriate proportion of subject periods, CNNCR strengthens alignment through management structure. It urges all schools and school systems to establish or strengthen management structures that will ensure accountability for a greater degree of alignment between the curriculum, pedagogy and assessment practices of upper primary and lower secondary schools.

Table 1 Subjects setting of compulsory education

	Grades								
	1	2	3	4	5	6	7	8	9
	E&L		E&S				I&M	I&M	I&M
							H&S (or H&G)		
			Science				S (or B, P,C)		
	CH	CH	CH	CH	CH	CH	CH	CH	CH
subjects	MT	MT	MT	MT	MT	MT	MT	MT	MT
			FL	FL	FL	FL	FL	FL	FL
	PE	PE	PE	PE	PE	PE	PE	PE	PE
	A (or M, or FA)								
			Comprehensive practical activity						
	Local and school-based curriculum								

Notes: (1) E&L = ethics and life, E&S = ethics and society, I&M = ideology and morality, H&S(or H&G) = history and society (or history and geography), S(or B, P,C) = science (or biology, physics, chemistry), FL = foreign language, PE = physical education, A (or M, or FA) = art (or music, or fine arts), CH = Chinese, MT = mathematics.
(2) Comprehensive practical activities include information technology education, research-based learning, community service, social practice, labor skills and technology education.

6 Outcomes of CNNCR

CNNCR has made much progress in the past five years. It has achieved a series of conceptual innovations and gained a break-through in practice. General Secretary of the Fourth National Curriculum Academic Seminar (2004) argues that its main outcomes can be demonstrated as follows.

6.1 Conceptual innovations

Concept or perspective is a theoretical framework for the implementation of a new curriculum.

(1) Innovative schools need to be set up. A school is a learning organization, where students are acculturated, rather than a company or a bureaucracy. A school should play a principal part in curriculum reform, building its unique curriculum through collecting and developing all kinds of curriculum resources both inside and outside the school.

Table 2 Subjects design and periods proportion of compulsory education

	Grades									Proportion in total periods of nine years (%)
	1	2	3	4	5	6	7	8	9	
Subjects	E&L	E&L	E&S	E&S	E&S	E&S	I&M	I&M	I&M	7%–9%
							H&S	H&S	H&S (or H&G)	3%–4%
			S	S	S	S	S (or B, P, C)			7%–9%
	CH	CH	CH	CH	CH	CH	CH	CH	CH	20%–22%
	MT	MT	MT	MT	MT	MT	MT	MT	MT	13%–15%
			FL	FL	FL	FL	FL	FL	FL	6%–8%
	PE	PE	PE	PE	PE	PE	PE&H	PE&H	PE&H	10%–11%
	Art (or Music, or Fine Art)									9%–11%
			Comprehensive practical activity							6%–8%
	Local and school-based curriculum or selective curriculum									10%–12%
Weekly total periods	26	26	30	30	30	30	34	34	34	274
Yearly total periods	910	910	1 050	1 050	1 050	1 050	1 190	1 190	1 122	9 522

Note: (1) E&L = ethics and life, E&S = ethics and society, I&M = ideology and morality, H&S (or H&G) = history and society (or history and geography), S(or B, P,C) = science (or biology, physics, chemistry), CH = Chinese, MT = mathematics, FL = foreign language, PE = physical education.
(2) 35 schooling weeks every year.
(3) Comprehensive practical activities include information technology education, research-based learning, community service, social practice, labor skills and technology education.

(2) Innovative curriculum needs to be designed. Curriculum is not only text-based material, but more importantly, an involved experience. The same curriculum has different meanings to individuals according to personal experience and understandings. So curriculum is involved in an individual's growth, so to some extent, it is an individual life-process and a dynamic formative "ecological system".

(3) Innovative teaching materials need to be compiled. Teaching materials serve as a bridge to connect the known and the unknown. It should be the catalyst that activates what is taught or learned instead of designated as simply learning

content. Helpful materials to students' all-round development, no matter whether they are science or humanities, are all good teaching materials.

(4) Innovative instructions need to be followed. Instructions should not be spoon-fed to students, but be heuristically taught. It is not only conveying knowledge and skills to students but also leading students to participate in exploring and experiencing life's journey. The form of instructions should no longer follow the "teacher-talk, student-listen" model, rather, there should be dynamitic interactivity, an engaged cooperation between teachers and students. Instructions should focus on a student's comprehensive development instead of exam-oriented education.

(5) Innovative teachers need to be trained. A teacher's role has diversified as a director, a constructivist, a cooperator, an activator, a participant, a designer and a leader.

(6) Innovative students need to be cultivated. Students are masters of their learning rather than machines to receive input for tests. Students play principal parts in education. They should be treated with respect. They share equal rights in personality with each other and with teachers.

6.2 Practical innovations

Based on the concepts of innovation, CNNCR has gained a break-through innovation in practice. The major changes can be displayed as follows.

(1) Three–level curriculum management has been established. Earlier in 1996, for the first time MOE put forward the three-level management (national, local and school levels) for general senior high school curriculum in *General Full-time Senior High School Curriculum Plan* (*trial*) and confirmed the management responsibilities for each level.

National level (Ministry of Education) should guide basic education reform macroscopically. It takes charge of the setting and proportion of subjects according to the essence and task of basic education. More exactly, a panel of specialists was brought together by MOE to make, amend, examine and approve, and issue curriculum plan and standards, as well as create guidelines for compiling, developing and managing teaching materials and curriculum evaluations. The list of approved teaching materials for primary and secondary schools is regularly publicized to society and schools. The open appraisal system for teaching materials and that for school-option on teaching materials are established under the direction of educational superintended institutes, etc.

Local level (provincial educational administrations or educational departments authorized by provincial educational administrations) should constitute provincial curriculum implementation and plan the development for local curricula

according to the requirements of the national curriculum plan and unique local situations. It should also make the guideline for how local schools should implement curricula. Educational administrations at city and county levels supervise and assess curriculum implementation, gathering experts to give directions to schools on how to make specific plans for curriculum enactment, ensuring the implementation of national and local curricula in schools and guiding schools specifically on how to develop curricula.

School level (none-preschool) should make a specific arrangement on required and selective subjects according to practical situations based on the regulations of national and provincial curriculum plans. It should also set reasonable subjects for its own school, participating in the implementation of curriculum adjustments, getting the approval of upper educational superintended administration, establishing school-level curriculum evaluations to guarantee consistency with national and local curriculum regulations and reporting issues regarding curriculum implementation.

In CNNCR across the century, the three-level management of curriculum takes no changes except that more automatic rights are given to local administrations and schools.

(2) The unitary requirement has become more flexible. The system of more powerful centralized curriculum management has been changed into central, local and school levels. CNNCR system of three levels and paralleling management system have been established nationwide except for some poverty-stricken areas. Local and school curricula lead instructions to students' real life. Thus, local governments, teachers and students are becoming more active in the curriculum reform. A series of unique alternative textbooks under the *National Curriculum Standards* has been endorsed by the MOE's Textbooks Inspection Department. A large number of schools have built their own school-based curriculum along with the local curriculum.

(3) The traditional uniform structure of curricula has been changed into two parallel categories. One is required courses like Chinese, math, English, physics, history, etc., which maintains every subject's characteristics and requirements. The other is comprehensive practical activity course plus selective subjects, which stresses the integration of various subjects to solve problems and supplements compulsory subjects.

(4) Professional training for teachers has completed its first round and the second round has been initiated. Every year each teacher is required to attend mandatory training at least 48 hours. The concepts of CNNCR have been warmly welcomed by almost all educational leaders and teachers at all levels in basic education. Their understanding of CNNCR theory and concepts has become deeper and deeper through learning and practice. The positive and active attitude towards the new curriculum reform has replaced the previous negative and passive one. Teachers have stepped out of the previous shade of doubt and on the

right track of new curriculum reform. Teachers' overall quality has been improved much more than ever before.

(5) Teacher-centered teaching has turned into a student-centered one. Students' major roles have been exerted to a maximum degree. They have become true masters of their learning. Thus, classroom instruction and learning are full of interactive and cooperative involvement. Never before have so much interest and enthusiasm of students been seen. Students' creativity and broad knowledge, especially active motivation have been enhanced. The student-centered instruction conveys many advantages of cooperative learning, research-based learning, engagement and involvement. Classroom instruction is no longer boring. And students' comprehensive quality has been improved. The practice has demonstrated that such a parallel structure of curriculum is good for students' comprehensive development.

(6) The systems for evaluation are becoming diversified to match students' individualities. Formative assessment, comprehensive evaluation and practical observation have been underlined. Grades and scores as indicators of success are becoming less pervasive. The tension of "teaching for the test, learning for the test" has been effectively limited. In order to meet the needs for students from different levels—nation, local areas and school—three-layered curriculum design and management system has been blueprinted in the curriculum reform framework. The basic model of such management allocates the different roles of each managerial level.

MOE lays out the macro guidelines for curriculum development: stipulating the variety and hours of the subjects, establishing the national curriculum standards and supervising the curriculum implementation.

The provincial or non-state administrative departments of education lay out the plan to implement the curriculum in accordance with the national guidelines, develop or select their individual curriculum which meets the needs of individual characteristics.

Each school is required to carry out the curriculum laid out by both the national and local governments, and to develop school-based curriculum which best reflects the needs of students and teachers of their own.

In order to realize this three-layered curriculum design and management plan, new curriculum reallocates the weight of curriculum plan for each level, shrinking the compulsory composition on the national level, reflecting leeway to some degree for the content and schedule arrangement of each subject, leaving much space for local governments and schools to make flexible choices and changes. In this way, the needs of schools, students and communities could be best met, and structure of the curriculum could be more practical and easy to carry out. All in all, this three-layered curriculum design and management plan stresses the roles of each participant. Each level of participant plays an indispensable role in training the talented individual for the modern society.

(7) Technology and techniques have been widely used in the instruction. CNNCR needs teachers and students to collect and share curriculum resources on websites or through internet. Teachers have never shown so much enthusiasm about information technology and multimedia. More teachers have become accustomed to making multimedia courseware.

(8) Skill education has been further perfected, which aims at helping students obtain positive experience of working and good skills. It advocates learning through operation and hands-on activities. In *National Basic Educational Curriculum*, it belongs to the comprehensive field study activities along with information technology, research study, community service and field work. It begins from the third academic year at primary schools. This idea is congruent with that of quality education which lays stress on the creativity and practical ability, the two key essences of talents for the contemporary development of society.

In the current curriculum, the original feature of the labor skill class has undergone changes. Its name has changed into "labor and skill" class, which shows both connection and discrepancy in between. It is the integration of the traditional Chinese ethic of "manual labor" and the modern needs for technological training.

The skill education represented in the new curriculum has the following six features (Li, 2001).

(1) Comprehensive "work-related skill" education curriculum design. Prior to CNNCR, "work-related skill" education, mainly as labor and technical education, was an independent subject. In the new curriculum design, "work-related skill" education is listed as a formally designated learning category, because it needs many different kinds of subject matter and other abilities. This is a big change in curriculum format.

(2) Content framework reconstruction. CNNCR chooses labor, domestic economy, techniques and career preparation as its main contents.

(3) Flexible target system. CNNCR proposes two levels for the content and targets of work-related skill education: basic content and extensive content. Basic content is the general requirement for reaching the minimum goals of work-related skill education, and extensive content is selective in advanced areas to reach a higher level of goals.

(4) Larger learning space for "work-related skill" education. Simple technological design, reading technical product specifications and comments on simple technical works are formally introduced into the new curriculum as learning content of work-related skill education. Agro technics is extended from traditional crops planting and animal breeding to seed improvement, technology experiment, product storage and process, marketing and sales.

(5) Establishing the assessment system to improve students' development. CNNCR takes combination of formative and summative assessment to promote students' development. In secondary schools, Certificate of Eligibility for labor and technology is underway.

(6) Orientation of the functions of families, schools and society in work-related skill education. CNNCR makes a clear boundary for the functions of families, schools and society, which has its own function in educational content selection, resources development and allocation, facilities management and experimental bases building.

7 Challenges and strategies to CNNCR

7.1 Shortcomings/difficulties or experience and lessons

Through five years of curriculum reform, typical problems or challenges focus on the following aspects.

7.1.1 Misunderstanding the perspectives of CNNCR: from one extreme to the other

Priority is totally given to the teaching method of CNNCR, which makes many traditional excellent teachers feel embarrassed. In effect, some of the traditional teaching methods are effective. Many time-tested effective methods are no longer appreciated.

The assessment of CNNCR (various formative-based alternative measurements) is adopted, opposing traditional closed tests. In fact, closed testing is still an efficient measurement to evaluate the mastery of descriptive knowledge. After all, the old evaluation system is no longer meeting the needs of new curriculum because of its weakness: over emphasizing the selective information while ignoring promoting students' development; over emphasizing knowledge and skills in textbooks while ignoring practical abilities and learning attitudes; over emphasizing quantitative paper tests while ignoring qualitative observation; over stressing the result while ignoring the process of problem solving, etc. All these leave many teachers and students, especially those preparing for *National Entrance Examinations* a big gap to fill. In 2004, complaints from some regions, such as Nanjing, Jiangsu Province, emerged. So it is easy to see that the old evaluation system has become a problem for the new curriculum to develop further. The reform of evaluation system has become the first thing in the future curriculum reform.

Students' major part is overemphasized regardless of teachers' leading/dominant part. In fact, student-centered instruction does not refer to giving

control or free rein to students, especially for those who are accustomed to the culture of obedience.

7.1.2 Contradictions in the operation of CNNCR

The contradiction between teaching materials and test requirements. The content of new teaching materials is so broad that it cannot reach the depth of tests.

The contradiction between limited teaching resources and limitless teaching requirements. CNNCR encourages teachers to develop school-based curriculum and students to participate in the development of school-based curriculum, but many teachers and students lack in effective facilities, methods to collect resources or adequate time to develop new lesson plans and materials.

The contradiction between the demand for qualified teachers and the current status of teachers. Open teaching materials and open instructions need teachers to have a wide knowledge base and high creativity to meet students' requirements.

The contradiction between the already heavy burdens placed on teachers and their demands for continued learning. Generally, one teacher is in charge of over 60, even over 100 students' academic instruction and corrective help or remediation. They have already been submerged by the instruction routine, now they have to learn, digest and apply CNNCR, which seems to be an extra burden for them.

The contradiction between strict instructional management system and flexibility of instructional design, especially out-door activities or games. Many of them required by new curriculum are not operative in reality under the existing instructional management system. For instance, a teacher is not allowed to bring students out of the school for just one lesson or two.

The contradiction between quality-oriented education and exam-oriented education. In a considerable period of time in the future, college entrance examination is still regarded as a major springboard for the younger generation's development. But such an examination focuses on students' academic performance rather than all-round development. As a result, it is a big challenge to CNNCR. Some districts, such as Nanjing, are in a dilemma whether to pay attention to students' academic records or all-round development.

7.1.3 Practical distortions of CNNCR

The heuristic approach is distorted into "question-answer" (the teacher asks questions and students answer them) instruction model. To embody the interaction between teachers and students, some teachers simply take the form of "question-answer", even sometimes, the question is self-evident. This kind of superficial inter-activity deviates from a heuristic.

Student-centered instruction is distorted into giving control to students. To replace teacher-centered instruction, some teachers give up leading parts/ dominant parts in instruction, some even take student-centered requirement as their excuse of escaping from hard work on instruction.

Activities in the classroom are distorted into aimless behaviors, even a mess of unstructured actions. Without structure, reflection and experience, students gain little in such actions, thus resulting in a waste of time.

Cooperative learning is distorted into groups dominated by individual students or the teacher. Some teachers fail to catch the essence of cooperative learning, only paying attention to the form of cooperative learning, without knowing when and how to divide students into groups, what to do by groups. So often, some out-going students dominate the group. Members of the group cannot share the real equal communication. Sometimes this kind of communication even makes students chat in class. Otherwise, teachers dominate the group and students cannot really learn much from it.

The essence of exploring or research-based learning is divided into a general method. Exploring or research-based learning proposed by CNNCR does not mean that it suits all kinds of learning, such as descriptive knowledge, which needs deductive instruction. So the generalization of exploring or research-based learning blindly can make class instruction lack of structure and results in formalism sometimes.

The request for values, emotions and attitudes towards education is distorted into label education. Some teachers have no idea of how to integrate them with subject content. So they have to design some schemas that are not connected to what they are teaching.

7.2 Experience and lessons of CNNCR

In developing areas, curriculum reform should be based on their conditions and follow their special laws.

CNNCR must be undertaken based on consequences of research and experts' direction.

CNNCR should pay attention to the integration with elite of traditional education, avoiding going from one extreme to the other and, thus, not completely denying the values and methods of the traditional instruction.

CNNCR should be adaptive to the local social environment and school conditions.

CNNCR should realize inter-school resources share. Advanced schools should transfer their experience to neighboring schools.

CNNCR is a process requiring caution rather than rushing into a massive movement.

CNNCR needs strict leadership and supervision. Local educational administrations should make scientific decisions according to the concrete situation.

CNNCR needs democratic management. Only when all teachers participate in the reform actively can the reform succeed in the end.

CNNCR needs to strengthen supervision and helpful feedback so that it can be adjusted to the right track in a timely manner.

7.3 Strategies

Teacher training is necessary. Teaching quality plays a key role in the success of CNNCR. Professional training should cover two parts: one is general knowledge of the new curricula; the other is methodology, leading teachers to integrate advanced methods proposed by new curricula with traditional methods. School-based teacher training should play a significant role in preparing teachers. MOE takes powerful measures to improve principals' and teachers' understanding of the new curriculum through in-service training. Three levels of in-service training for principals and teachers have been undertaken since the beginning of CNNCR.

The inspective and guarantee system of quality should match CNNCR. Regarding education system and teaching management, it should include the comprehensive assessment system of teaching quality, publicizing system of instruction information, system of subject competition, system of research management, system of teaching consequence inspection and assessment, system of management on writing test items, system on management on textbooks choosing and system of teaching quality appraisal. The future evaluation system reform should promote formative assessment, give prominence to the function of development, protect students' self-esteem and self-confidence, embody respect and cherish, care about individual situations and need, highlight the process of development and changes, emphasize comprehensive abilities—not only care about students' performance but also discover and develop students' various potentials, combine paper tests with activity tests, advocate comprehensive assessment on students' progress and changes in emotions, attitudes, value views, creative consciousness and practical ability, stress diversification of evaluation items, and take alternative measurements such as open qualitative evaluation, observation, discussion, research-based learning, situational test, growth portfolio, etc. All of these measurements can provide more alternative ways to avoid the traditional phenomena of one test deciding a student's future.

Measures should be taken to protect from unexpected situation.

Classes should still be a controlled environment. Both independent learning and cooperative learning take more time than traditional methods. So what and

when is best for student-centered instruction versus what and when is best for teacher-centered instruction should be kept in mind.

These new curriculum reforms should not increase students' responsibilities. One of the new curriculum's original intentions was to reduce students' load, but a new custom of discovery learning is a new challenge to students who are accustomed to traditional methodologies. So teaching students on how to learn creatively is a preliminary step for increasing efficiency.

Logical gaps in knowledge as contained in the traditional text books should be avoided. It has been found that in the new curriculum, some knowledge lacks elements of its unique logical chain. So teachers have to supplement some necessary knowledge with "scaffolding".

Cheating or injustice is not allowed in the qualitative evaluation. If only a few people decide students' access to higher education through qualitative evaluation, who knows how much or how little justice and equality there will be in such a subjective-oriented evaluation?

American curriculum reform in the 1960s cannot be copied. The instruction of discovery learning, research-based learning, student-centered instruction were advocated then but with the result that the basic knowledge and skills did slide down ten years later, which shed doubt on American curriculum reform's consequence. But China should learn from such historical lessons.

Full advantage of modern information technology should be taken to build educational resources network so that teachers and students can have access to education resources.

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