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Investigation and Analysis of Teacher's Textbook-using Status Quo in the Northeast of China

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This study used the relevant work of "Investigation of New Century Primary Mathematics Textbook's 10-year Implementation (2001-2011)" to survey teacher's textbook-using status quo in the Northeast of China. It found that 82.4% of teachers could adapt the new century textbook, 94.3% of teachers could realize the significance of curriculum standards, roughly 80% of teachers had judgment awareness of textbook, and over 95% of teachers could accept new mathematical teaching views. This text also analyzed existing problems: most teachers couldn't build direct relationships between curriculum standards and instruction, and their judgments on textbook were always based on experience and intuition.

Key words: *Teacher, textbook-using, investigation, analysis.*

In the early days of New China, primary and secondary school textbooks' compilation and publication had been under relatively centralized management system, which referred to "one unified syllabus, one unified textbook version" policy. The country had set up a professional textbook press, People's Education Press, and drawn a large number of experts from all over the country to compile a set of unified textbooks in order to meet the basic needs of education development for New China. After Reform and Opening-up, people began to explore implementation of the "one unified syllabus, multiple textbook versions" policy.

With the implementation of New Round Basic Education Curriculum Reform which officially started in 2001, textbook policy gradually realized transition from "one unified syllabus, one unified textbook version", to "one unified syllabus, multiple textbook versions," and to "one set of unified standards, multiple textbook versions". The National Appraisal Committee of School Textbooks had examined and passed about 167 textbooks versions involving 22 subjects which schools were allowed to select and use. Then, "one unified standards, multiple textbook versions" policy put forward the new requirements for teacher's use of textbook: "standards" requires teachers

to understand its status and role; "multiple" requires teachers to have textbook evaluation consciousness.

In July of 2001, the Ministry of Education promulgated the Compendium of Curriculum Reform of Basic Education (Trial), and put forward new requirements for course contents, "Change course contents' difficulty, numerous, partial, old and highly-academic current situations, strengthen course contents' contacts with student lives, modern society and development of science and technology, pay attention to students' learning interests and experience, select the necessary knowledge and skills for lifelong learning" (Li, 2001).

Traditional textbooks compiled by People's Education Press (PEP) can represent classic teaching materials which focus on how to teach, while standards-based textbooks stress how to learn. At present, there are seven more popular primary mathematics textbook versions, which are published by People's Education Press, Beijing Normal University Press, Jiangsu Education Press, Zhejiang Education Press, Southern China Normal University Press, Hebei Education Press and Qingdao Press.

Among these versions, New Century mathematics textbooks published by Beijing Normal University Press are the most representative. Their design philosophies are as follows: pay attention to students' life experience, closely connect mathematics with reality; show the production and application process of knowledge, form the basic narrative mode of "problem situation - model - interpretation and application"; promote students' participation, inquiry and communication using mathematical activities as links; pay attention to students' emotional experiences and create a comfortable and harmonious learning atmosphere; from the shallow to the deep, step by step, upward with spiral; highlight mutual and comprehensive contacts between knowledge; pay attention to students' different math learning needs; and embody cultural values of mathematics combining with proper materials.

From the year 2001 to 2011, Chinese New Round Basic Education Curriculum Reform (hereinafter referred to as "**New Curriculum Reform**") was implemented for 10 years. Our concern is whether teachers who have adapted traditional PEP textbooks and grown up under the influence of "one unified syllabus, one unified textbook version" policy can well adapt the new textbook policy and standards-based textbooks. Seizing the opportunity of "Investigation of New Century Primary Mathematics Textbook's 10-year Implementation (2001-2011)," we surveyed and analyzed teacher's textbook-using status quo in the Northeast of China.

"Teacher's textbook-using instruction" refers to how teacher use the textbook in the process of curriculum implementation, with the aim of fulfilling tasks and achieving goals. It includes analyzing textbooks, integrating curriculum resources inside and outside of the text, conducting lessons with textbooks, making judgments on textbooks, and other related

specific work. (Kong & Shi, 2009)

Investigation

We set up the Northeast investigation team, confirmed our schedule, then began our two-month work in October, 2011. Experienced professor was in charge of the team.

Survey Scope

We selected Changchun City, Liaoyuan City, and Dalian City for our field survey. Among them, Nanguan District and Nongan Country of Changchun, Longshan District of Liaoyuan, and Gan Jingzi District of Dalian were the first areas to implement the New Century textbook; all of them have implemented the New Century textbook for 10 years. In addition, these areas involved urban and suburban districts, and developed and undeveloped districts, so in some sense, they could be an appropriate representative of the Northeast of China.

Tools

We collected data in two ways: a questionnaire for teachers and a focused interview with teachers and administrators. We mainly used the questionnaire provided by the New Century Primary Mathematics Textbook Editorial Group. The main part of the questionnaire is the original questionnaire about investigation of new curriculum implementation status designed by the Ministry of Education. The questionnaire mainly focused on four aspects of design: Understanding of standards' contents and objectives, planning lessons with the textbook, conducting lessons with textbooks, and making judgments based on textbooks.

In addition, we designed the outline of the focused interview. For teachers, we were mainly concerned about the teacher's feeling regarding using the New Century textbook, their cognition of relationships to the standards, textbook, teacher and students; For administrators, we would like to know what measures schools have taken to help teachers use the New Century textbook.

Samples and Methods

School sampling: in Changchun City, we conducted a general investigation in Nanguan District and Nongan Country. That is, every school in these two districts was selected as a sample, and there were 71 sample schools in total. In Longshan District of Liaoyuan City and Gan Jingzi District

of Dalian City, we conducted stratified sampling and extracted 12 sample schools in total from each district 6 schools were extracted.

Teacher sampling: all the teachers who taught math with the New Century textbook in the sample schools were invited to fill out questionnaire surveys; 1372 copies were issued in total; and then we randomly selected 101 teachers to do focused-interview surveys.

Administrator sampling: directors in charge of mathematics instruction in sample schools were randomly selected, and they were invited to fill out focused-interview surveys; 42 directors were interviewed in total.

Findings

Teacher's Standards Views

Before New Curriculum Reform, teacher's instruction was directed by a syllabus, a kind of guidance document in the form of an outline which scheduled relevant discipline contents according to a teaching plan. It stipulated basic requirements of the scope of teaching material and its system, teaching progress and teaching method. Generally speaking, the starting points of the syllabus were teachers and their teaching, rather than students and their learning.

When the New Curriculum Reform started in 2001, mathematics curriculum standards (hereinafter referred to as "standards") replaced the mathematics syllabus (hereinafter referred to as "syllabus"). The Compendium of Curriculum Reform of Basic Education (Trial) prescribed, "National curriculum standards are the basis of compiling textbooks, teaching, assessment and examination design, are the foundations of national management and course evaluation. It should reflect basic national requirements of knowledge and skills, process and methods, attitudes and values for students at different stages, prescribe the nature of every course, its objectives, content framework, and put forward suggestions for teaching and evaluation" (Li, 2001). In general, the starting points of standards are students and their learning.

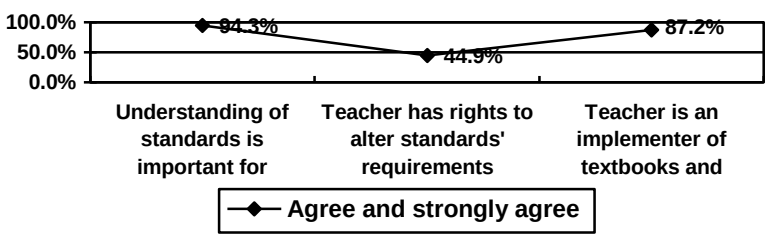

Figure 1. *Results about teacher's views of standards.*

The results of the questionnaire survey indicated that 94.3% of

teachers had realized the great significance of standards, and 87.2% of teachers had acknowledged their implementer identity. But when came to the question whether teachers could alter standards' requirements, there were two obviously opposite opinions; 44.9% of teachers thought they could, but the rest, 55.1%, didn't agree. According to this, we could infer that nearly half of teachers were still not sure about standards' status and function (see Figure 1).

Information we collected from focused interviews with teachers also would confirm this inference. For example, one teacher said, "Yes, we always read the mathematics standards. Our school also has organized standards-studying activities several times; even so, I still can't understand some ideas in it well; it is somewhat difficult for primary teachers to understand." Another teacher said, "We are asked to read standards before the beginning of every semester's beginning. I think standards are just about some requirements students need to meet and not very helpful for teachers' instruction."

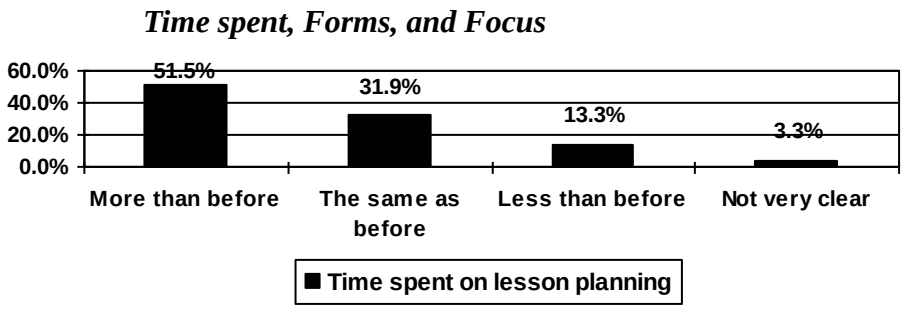

Figure 2. *Results about teacher's time spent on lesson planning.*

In the results of questionnaire survey, 51.5% of teachers felt that they needed to spend more time on lesson planning than before. Representative opinions are, "We need to do lesson preparation carefully in order to dig out its key and difficult points, because the textbook didn't tell us clearly"; "There are a lot of knowledge extensions in the textbook, besides rich teaching experiences. You need to spend more time studying the textbook to know what they are" (see Figure 2).

In addition, information we collected from focused interviews reflected that teacher's lesson planning forms tended to be diversified, just like personal preparation, collective preparation, online preparation, and same lesson with different structures. One teacher said, "Every week, we have regular time for collective lesson preparation to let every teacher clearly know what the difficult point of knowledge is"; another teacher said, "We often discuss together, formally and informally."

At the same time, more and more teachers began to focus on students' interests and abilities when they did lesson preparation; they said, "We make some adjustments according to students' specific learning status, then students

can feel more interested in learning" and "Lesson planning should focus on tri-dimension objectives, especially the development of students' abilities."

Ways of Task Design

Before New Curriculum Reform, most of the teachers strictly designed the task in accordance with the textbook for fear that there existed discrepancies.

After New Curriculum Reform, some changes had taken place.

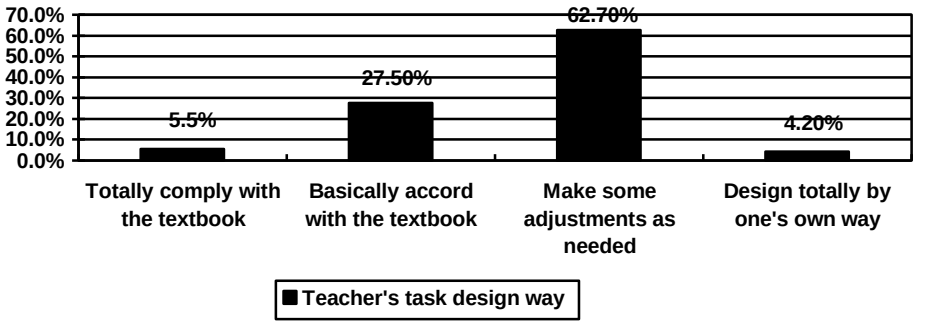

Figure 3. *Results about teacher's task design way.*

The proportions of two extreme cases "totally comply with the textbook" and "design totally by one's own way" were the least. The majority of teachers were able to make some adjustments according to the actual situation, equipped with the consciousness of "teaching with the textbook", instead of "teaching the textbook". Just like one teacher said, "Don't be limited by the mathematics textbook; we should teach students in accordance with their aptitudes" (see Figure 3)

Mathematics Teaching Views

Before the New Curriculum Reform, "Middle School Mathematics Teaching Outline (Draft)." promulgated in 1952, first put forward the concept of "double bases" (Curriculum and Textbook Research Institute, 2001), it had not played an important role to Chinese basic mathematics education reform. But since the 1990s, its value was gradually alienated and became the characteristic symbol of "examination education." That is, emphasizing systematic, logic and formalized knowledge, grasping proficient skills through memory and practice, implementing the exercises tactics oriented by deductive thinking.

The New Curriculum Reform, "Full-time Compulsory Education Mathematics Curriculum Standards (Experimental Draft)" indicated that mathematical knowledge included mathematical facts and mathematical

activity experience. That is, the extension of "mathematical knowledge" was expanded, including not only objective knowledge which referred to mathematical facts, but also subjective knowledge which referred to mathematical activity experience (Sun, 2011). "Compulsory Education Mathematics Curriculum Standards (2011)" clearly put forward the concept of "four bases": basic knowledge, basic skills, basic thought and basic activity experience.

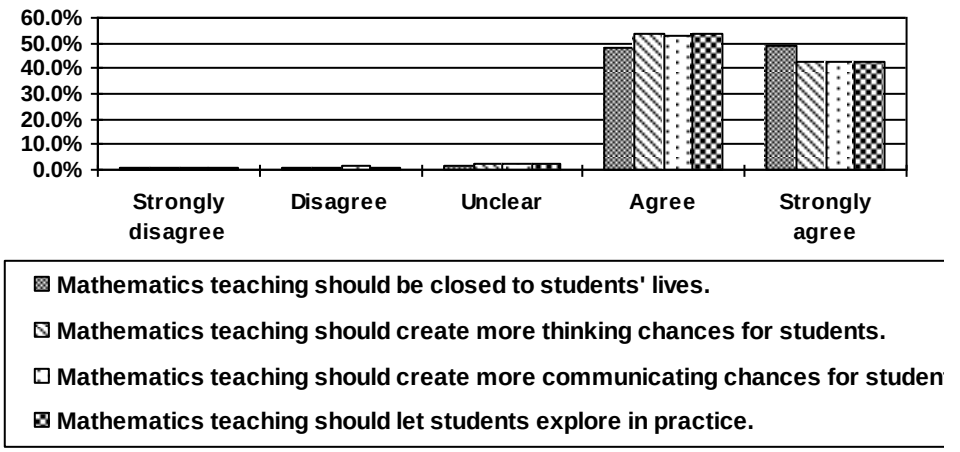

Figure 4. *Results about teacher's mathematics teaching views.*

Results from questionnaire survey showed us, 97.2% of teachers agreed "mathematics teaching should be close to students' lives", 96.1% of teachers agreed "mathematics teaching should create more thinking opprtunities for students", 95.9% of teachers agreed "Mathematics teaching should create more communicating opportunities for students", 95.8% of teachers agreed "mathematics teaching should let students explore in practice". So we could infer that the majority of teachers had changed their mathematics teaching views, in accordance with the teaching philosophy that New Curriculum Reform advocated (see Figure 4).

Teaching Methods and Contents

Before the New Curriculum Reform, teachers were deeply influenced by "one unified syllabus, one unified textbook" policy, and regarded the textbook as the "teaching bible". They blindly followed the textbook, rarely doubted the textbook, rarely considered why they taught, and this kind of thought was deep-seated.

After New Curriculum Reform, something has changed.

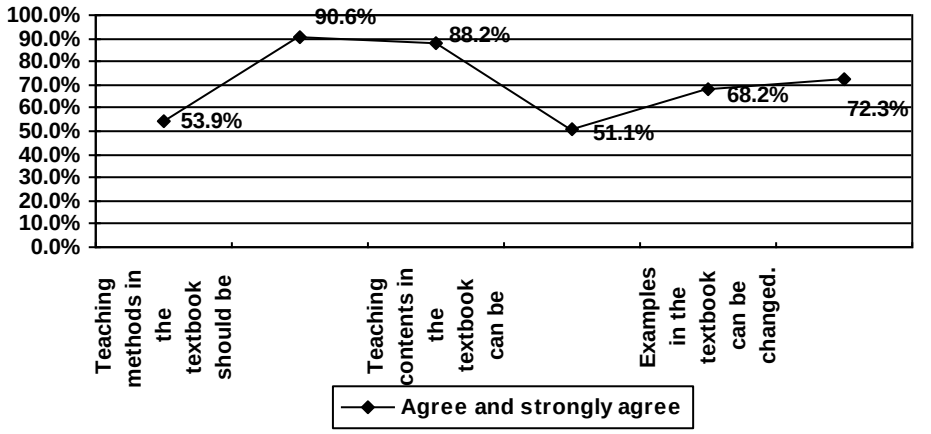

Figure 5. *Results about teacher's views of teaching methods and contents.*

Regarding teaching methods, although 53.9% of teachers agreed that teaching methods in the textbook should be complied with teaching approach, 90.8% of teachers agreed that they could use their own teaching methods. So we would conclude that teachers might realize their subjective initiatives while still respecting the textbook (see Figure 5).

Regarding teaching contents, 88.2% of teachers agreed that teaching contents in the textbook could be increased while 51.1% of teachers agreed that teaching contents in the textbook could be decreased. We worried that this tendency might cause additional academic burden for students. Just as Zhong described, "The school teachers or parents often worry that knowledge from one version of the textbook may not be able to cope with the university entrance exam, so the more the better, and ultimately dwarf school courses into 'heavy scores, light education' simple mechanical training tools" (Zhong, 2009). In addition, 68.2% of teachers agreed that examples in the textbook could be changed, and 72.3% of teachers agreed that exercises in the textbook could be changed, which reflected that the view of the "sacred" textbook to some extent had improved.

Teacher's Adaption of the New Century Textbook

Before New Curriculum Reform, the PEP mathematics textbook was systematically arranged in line of mathematical knowledge. Most of teachers liked this style, just as one teacher described, "Any of us who had the PEP textbook would know how to teach".

After the New Curriculum Reform, the New Century mathematics textbook was exactly arranged to align with students' cognitive level, using knowledge acquisition process instead of conclusion presenting, and whether teachers could adapt it well or not.

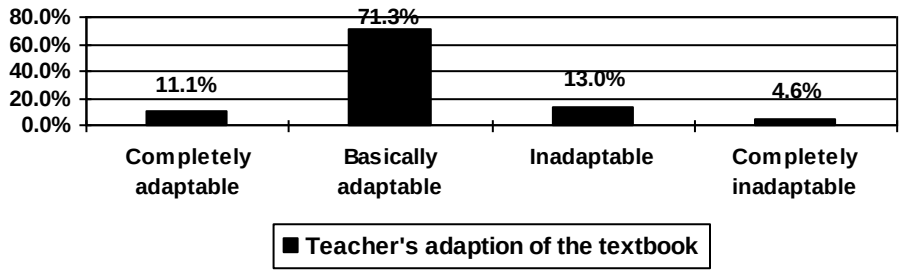

Figure 6. *Results about teacher's adaption of the textbook.*

We found that 82.4% of teachers were able to adapt the New Century textbook, just a small group of teachers showed inadaptation; they thought, "Presentation of some important definitions, properties, methods and formulas in the textbook are not clear, which can't play a role in teacher's lesson preparation, teaching and student's self-study" (see Figure 6).

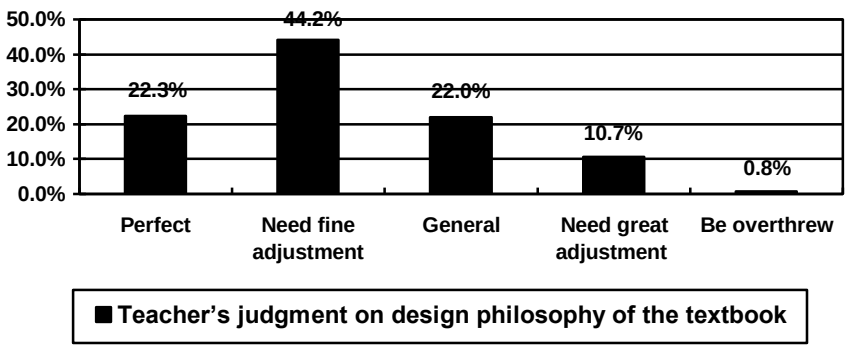

Figure 7. *Results about teacher's judgment on textbook's design philosophy*

There were 22.3% of teachers considering that the New Century mathematics textbook's design philosophy was quite good with no need for adjustment. The rest, 77.7% of teachers, thought that the textbook's design philosophy needed some different degrees of adjustments which manifested that most teachers no longer blindly followed the textbook and began to have their own reflections. One teacher in the interview said, "The design philosophy of the textbook is good, but knowledge is not arranged systematically enough, so it is hard to put this philosophy into practice" (see Figure 7).

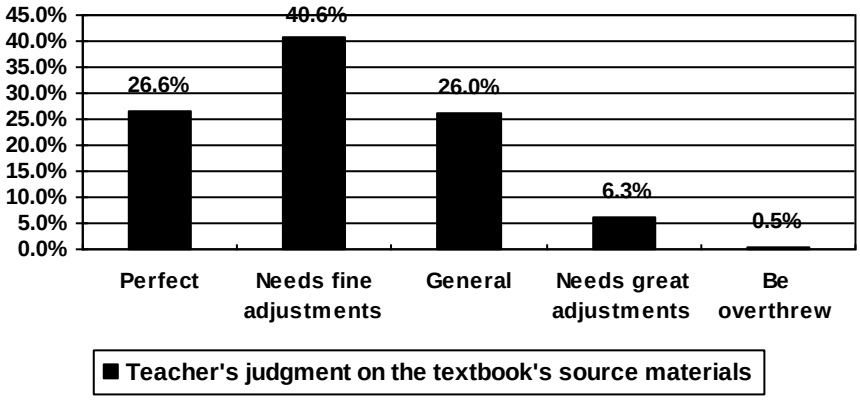

Figure 8. *Results about teacher's judgment on textbook's source materials.*

See Figure 8, there were 26.6% of teachers considering that the New Century mathematics textbook's source materials were quite good and no need for adjustment. The rest, 73.4% of teachers, thought that the textbook's source materials needed different degrees of adjustments. They thought, "Some of them are far away from students' lives and hard for students to understand" (see Figure 8).

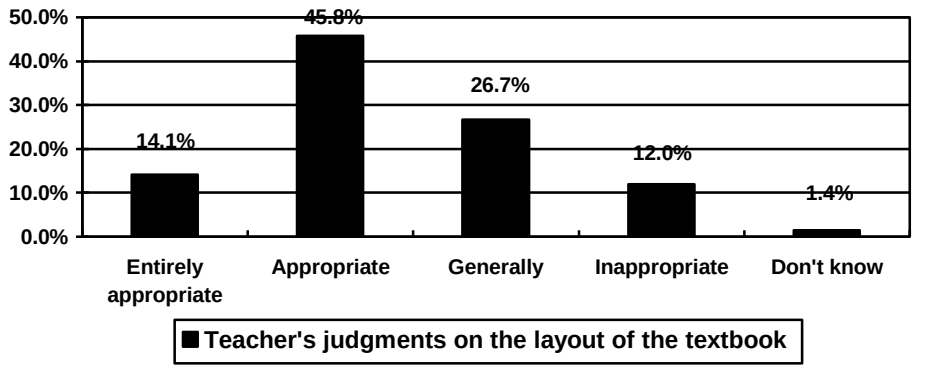

Figure 9. *Results about teacher's judgment on textbook's layout.*

There were 14.1% of teachers considering that the New Century mathematics textbook's layout was entirely appropriate and there was no need for adjustment, 1.4% of teachers didn't know how to judge, and the rest, 84.5% of teachers, thought that the textbook's layout needed some improvements. They said, "Spiral arrangement of knowledge make students easily forget what they have learned in the first school year, and we have to relearn the knowledge when they step into the new school year" (see Figure 9).

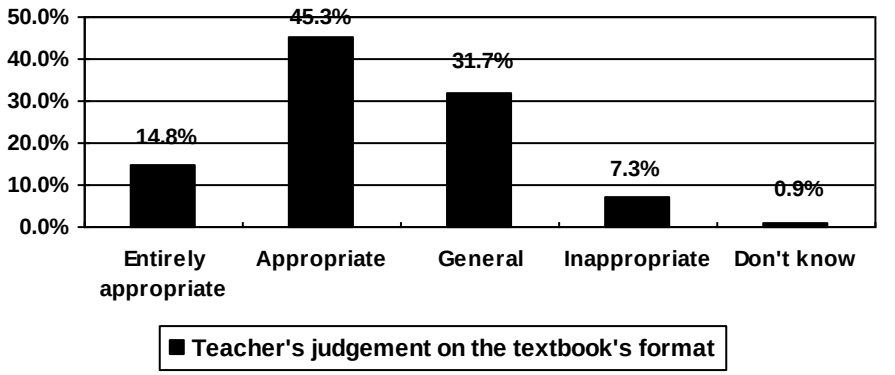

Figure 10. *Results about teacher's judgment on textbook's format.*

There were 14.8% of teachers considering that the New Century mathematics textbook's format was entirely appropriate and there was no need for adjustment, 0.9% of teachers didn't know how to judge, and the rest, 84.3% of teachers, thought that the textbook's format needed some improvement. They said, "The lifestyle title (eg. tree planting) replaces the mathematics subject (two digits by one digit division), and it is not good for students to grasp knowledge form the whole" (see Figure 10).

Discussion

From the above, 82.4% of teachers would adapt the new century textbook, 94.3% of teachers could realize the significance of standards, and roughly 80% of teachers had judgment awareness of the textbook, and over 95% of teachers could accept new mathematical teaching views. These changes were delightful, but there are still some problems existing: most teachers couldn't build direct relationships between standards and instruction, and their judgments about textbook were always based on experience and intuition. So we will conduct a discussion here to find causes and solutions to these problems.

Direct Roles of Standards

Direct roles mean that standards have direct reference values for teacher's instruction. But the investigation results relating to this aspect did not appear positive. 87.7% of teachers approved that the teacher's book was of great help for their lesson preparation rather than were the standards; most of them thought, "When it comes to the specific lesson, standards don't work," so they seldom studied the standards when they prepared the lesson.

This may stem from the differences between the mathematics syllabus and the standards. The syllabus focused on the provision of teaching work, specified the basic teaching goals, teaching contents, teaching requirements

and some teaching suggestions, which made teachers pay more attention to the knowledge and the results (Li, 2002). Standards are designed to take content standards as the main body, which reflect the overall expectations for students and the cumulative outcomes of class hours. If teachers still continue to use the ideas of syllabus to simply find correspondences between daily teaching and standards, they will feel disappointed and gained little.

So teachers first need to profoundly understand the standards' status, roles and differences with the syllabus in order to grasp the overall expectations for students, then according to the concrete learning and teaching situations, specify expectations into grade goals, and specify grade goals into teaching objectives for every lesson. Some scholars (Porter, 1998; Xia & Cui, 2006) have researched standards' practical influences from the respect of effectiveness of education policy. They indicated that there were several ways to enhance the standards' practical influences: increasing standards' provision of teaching, strengthening the consistency of relevant curriculum, teaching policy and standards, implementing the standards and standards-based evaluation simultaneously, and establishing the system and instrument of regular test for implementation of standards. Generally speaking, the standards themselves should not be a "loner".

Build the direct relationship between standards and instruction to make the standards give a full picture the role of "scale", so when teachers find it hard to "change the standards' language into the clear picture of ideal classroom practice" (Mundy, 2002), they will turn to the teacher book and the test to seek the basis of teaching.

In addition, the effectiveness of teacher's training should be given more attention. Through the interview with administrators of schools, we found that in order to implement the New Century Textbook, schools have conducted a variety of activities, like subject conferences, new textbook training activities, network teaching research activities, as well as teaching quality assurance measures, such as collective lesson preparation, pushing door to attend a lecture, and so on. However, most of these activities and measures give much more focus to the class, and seldom focus on standards' research. So when the teacher is asked to "What roles of standards do you think can play in your teaching", teachers usually answered, "Its philosophy, teaching and evaluation suggestions," and paid little attention to the contents and goal requirements of standards. So we can infer that teachers' judgments of the textbook are mostly based on their experience and intuition.

Therefore, to give full attention to the standards' direct roles, it should adopt "top-down" and "bottom-up" approaches. First, the "standards" themselves should perfect their system, then schools should specify the standards' contents and goal requirements level by level until they can be operated by teachers, to make teacher's judgments on the textbook and instruction more reasonable.

Indirect Roles of Standards

Indirect roles mean that philosophy and values delivered in the standards have indirect influences on teacher's instruction. In the survey, we found that most of teachers were able to adapt the new mathematics teaching views, but teachers reflected that these views were hard to put into practice. The investigation reflected two causes:

In the textbook itself, "Exercises and example can't combine organically and this inadvertently increases the knowledge capacity of classroom teaching"; "The textbook's spiral arrangement sequences make it hard for teachers to grasp the basic requirements of every spiral"; "Implicative design ideas of the textbook make it hard for teachers to understand"; "The teacher book has less useful contents"; "Fewer course wares cause teachers take lot of time to prepare the lesson and there is no time to study the textbook".

Pressures from examinations, "If considering the test, I will choose the PEP textbook; if considering the development of students' abilities, I will use the New Century textbook"; "For example, the tabulation method in the New Century textbook can be used to exercise students' minds, but the tabulation method will become trouble when students used it in the examination; the papers don't look so neat either"; "Although this textbook encourages students to solve problems in diversified ways, we still will select one optimum way to let students grasp it, thus, they will save a lot of time in the examination".

Just as Zhu Muju, the Basic Education Inspector of the Ministry of Education, said, "At this development stage, the shortage of high quality educational resources, the impact of the employment problems and the great inertia of the traditional culture, all lead to the entrance competitions. In fact, these are social problems reflected in the education field. But the education responsibility is, even if there are fierce competitions, educators should let students grow regularly and with dignity" (Zhu, 2011).

Multiple: Teacher's Judgment about Textbook Should Be Reasonable

Here we refer to reasonable judgment basis, judgment purpose and judgment process. During these ten years (2001-2011), teacher's judgment awareness has awaken to some extent, but the judgment basis is not unified, mostly based on their experience and intuition. The judgment purpose mainly focuses on whether to help students grasp the basic knowledge and skills, especially for the entrance examination; The judgment process often lacks sufficient understanding and correct interpretation of the textbook. In addition to the reasons from the standards and the society, there are two other aspects:

Regarding quality of after-sale service of the textbook, in this survey, 49% of teachers thought "Textbook Press offers good quality of training service for teachers, and is helpful for improving teacher's professional level";

33.5% of teachers regarded the quality of training as general, 17.5% of teachers thought the training was not helpful. Just as one principal said in the interview, "The training was going very well at the beginning, from provincial level, to municipal level, to district level, to school level. But two years later, when teachers had confusions regarding the operation, the strength of this kind of training was not inadequate". From the point of textbook editors' views, clearly delivering textbook's design ideas to schools and teachers, carrying out relevant training, and providing relevant supporting resources and services, are the basic guarantees for the textbook to take effect, and are also prerequisites for teachers to judge the textbook reasonably.

Regarding teachers' teaching load problem, among 1372 teachers, full-time mathematics teachers only account for 20.7%, 8.1% of teachers teach one major subject and one minor subject, 69.4% of teachers teach two major subjects. Teachers generally indicated that they had no more time and energy to study the textbook, even if they had realized the significance of textbook research. Therefore, plenty of time and energy is another requisite or guarantee for teachers to conduct textbook research.

From the sample survey and analysis of teacher's textbook-using status quo in the Northeast of China, we deeply realize the two change principles mentioned in Hall and Hord's (2004) works "Change is a process, not just an event" and "Promotion of change needs team efforts." Although teachers' knowledge and beliefs are targets of change, they also influence change by serving as a filter through which teachers interpret new information, including curriculum content and reform recommendations (Borko & Putnam, 1996; Cohen & Ball, 1990). Therefore, each unit (textbook editors, standards makers, and teacher's trainers) should make good transitions for teachers' correct and creative textbook use in the next unit.

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