

The Patterns of China Learning from PISA in Education Monitoring: A Literature Analysis of China “Compulsory Education Quality Monitoring Programme” (CEQMP)

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ABSTRACT

PISA has a strong influence on education policymaking all over the world. In 2015, based on the experience of PISA, China conducted its first education quality monitoring programme, the "Compulsory Education Quality Monitoring Programme" (CEQMP). In this paper, the central questions are "What is the patterns of China learning from PISA in education monitoring?" and "What improvements should be done in the patterns of China learning from PISA in education monitoring?" This brand-new programme has a number of problems to be solved, which include governance, process, indicators design, and results presentation. For future development, this paper proposes that China should not only use PISA as a guide into details, particularly but also need to try to surpass it.

Keywords: *PISA, China, quality monitoring, pattern, national assessment*

1. INTRODUCTION

PISA (Programme for International Student Assessment) measures reading, mathematics and science knowledge and skills to deal with problems that happened in the reality of 15-year-olds students. PISA has a strong influence on education policymaking all over the world. Over 65 countries and economies, including China, has adopted PISA as an almost global standard [1]. According to the Minister of Education, up to 2015, there are more than 9 million full-time teachers and nearly 140 million students, with more than 260,000 compulsory schools in China [2]. China did not establish a national system of education assessment before. Thus, it is hard to evaluate the quality of compulsory education. In 2015, based on the experience of PISA, China conducted its first education quality monitoring programme, the "Compulsory Education Quality Monitoring Programme" (CEQMP), and its first result report was published in 2018. The programme is guided by the Outline of the National Medium and Long-term Education Reform and Development Plan (2010-2020) and The National Compulsory Education Quality Monitoring Policy. According to MOE, this programme aims to reveal students' academic outcome, physical and mental health and changes, analyse the factors that influence education quality, provide references for future improvement on school teaching, and change the practice of taking the enrolment rate as the only standard for evaluating schools and students [2]. The monitored disciplines include Chinese, Mathematics, Science, Sports, Art and Moral Education, and students are from 4th (10

years old) and 8th grade (14 years old). The National Assessment Centre for Education Quality, established in 2007, is the leading institution.

However, this brand-new programme has a number of problems to be solved. Therefore, to analyze the potential benefits that PISA can bring to China education quality monitoring system, it is worth to study deeply on the relationship between PISA and CEQMP. This paper tries to answer two questions: On what aspects did PISA influence China "Compulsory Education Quality Monitoring Programme"? What should China learn from PISA in education quality monitoring in the future? This paper systematically reviews several important CEQMP documents and make comparisons between CEQMP and PISA in order to answer the questions. The first section concludes the influences of PISA on CEQMP. In the second section, this paper intends to reflect on the pattern that China learn from PISA, and presents the implications on China future education quality monitoring programme.

2. LITERATURE REVIEW

2.1. Different patterns of learning from PISA in national assessment and evaluation worldwide

In the context of globalization, digitization, enhanced computing power and new governance models, the educational accountabilities are being redefined [3]. PISA has been used directly into some countries' national

assessment. Breakspear [1] highlighted six key roles of PISA in national or federal assessment and evaluation

policies and practices (Table 1):

Table 1 Six key roles of PISA in national or federal assessment and evaluation policies and practices

Role of PISA	Example
Provided a systematic assessment for countries/economies with no experience in conducting a national/federal assessment	Greece, Latvia and Poland
Facilitated the formation or expansion of a national/federal assessment system	Austria, Germany, Hungary, Ireland, Japan, Luxembourg, Norway, Poland and the Slovak Republic
Supplemented national data and verified national results according to international benchmarks	Canada, Hong Kong-China, Singapore, Spain, Chile
Used for evaluation within the country/economy regions or student groups	Australia, Belgium [Flemish Community], Canada, Denmark, Estonia, Finland, Israel, Italy, Mexico, Poland, Slovenia, Spain, Singapore and the United Kingdom
Used as a "model" or "guide" for developing and adjusting national/federal assessment policies and practices	Hungary, Korea, Slovak Republic, Italy, France, Chile
Used to evaluate the effect of educational reform	Hong Kong-China, Poland, Singapore, England-UK, Israel, Mexico

Specifically, "facilitated the formation or expansion of a national/federal assessment system" and "used as a 'model' or 'guide' for developing and adjusting national/federal assessment policies and practices" are similar to the pattern that China learned from PISA. PISA can not only be used as an instrument but can also have an indirect effect on educational policy agenda-setting. It had a significant impact on the value of educational quality, the discovery of factors affecting the quality of education, the direction of education reform and development, and it promoted countries to pay more attention to the education quality monitoring [4]. In general, PISA changed education quality monitoring worldwide.

2.2. Proposed patterns of learning from PISA in national assessment and evaluation in China

China's first PISA result was published in 2011. However, back in 2009, Kong Xiangjuan [5] has already firstly proposed that PISA, as a scientific and process-orientated programme, has important implications for establishing China's own quality monitoring system of compulsory education. Researches in China on PISA and its meanings for China's own quality monitoring system of compulsory education, as of 2020, basically includes five aspects: values of monitoring, monitoring organization, monitoring method, monitoring process and monitoring report.

In terms of values of evaluation, Chinese scholars highlighted the consciousness that monitoring has profound meanings should be formed. Specifically, PISA focuses on whether students have the knowledge and skills they need in their future life, which reminds that China can

also adopt students-orientation and social-orientation monitoring. Zhan Chunqing [6] particularly put forward that China's education monitoring should aim to promote students' lifelong and all-round development.

In terms of monitoring governance, most of Chinese scholars focus on promoting the professionalism of the monitoring system. To achieve this, China should clarify the functions of monitoring organizations, and establish monitoring agencies which are independent of the educational administrative system. In particular, China should promote deeper cooperation among the government, universities and scientific research institutions, in order to cultivate professional educational quality monitoring team. In terms of monitoring method, Chinese scholars pay attention to draw on PISA methods. For example, the monitoring should contain more authentic assessments and reflect the process, not just result. Lu Jing [7] argued as well that in order to improve the design and scoring of open-ended questions, China should solicit the opinions of students and teachers to set a more diversified scoring standard. There also have some articles proposing that monitoring questionnaires can be based on the investigation of PISA systems, and it can be carried out from the macro and micro levels.

In terms of the monitoring process, the transparency and normalization of PISA are what Chinese scholars focus on. Especially in student sampling and scoring, China should carry out monitoring according to a standardized procedure to improve the accuracy of the evaluation as PISA.

In terms of monitoring result, Chinese scholars consider the application of the result as a key. PISA's result reports are known as clear, detailed and all-round. Therefore, China can study the PISA's experience, and try to establish

a complete monitoring results report, analysis and interpretation system. In addition, PISA's huge effect partly benefits from the propaganda. China can strengthen the use and publicity of the monitoring results in order to popularise the scientific and comprehensive education quality concept.

In a nutshell, PISA has attracted the attention of Chinese academia. The practice of PISA in values of monitoring, monitoring governance, monitoring method, monitoring process and monitoring report can inspire China when constructing its own monitoring system.

3. THE PATTERN OF CEQMP LEARNING FROM PISA AND ITS LIMITATIONS

3.1. Values of evaluation

PISA's values on assessment can be summarized in four keywords: "policy orientation", "literacy", "lifelong learning" and "regularity". PISA evaluates student performance and collects data on students, but for policymakers, the actual meaning of PISA is helping them

establish benchmarks for improving the education and understanding the relative advantages and disadvantages of education systems [8]. Therefore, PISA also contains features of policy orientation. Similarly, CEQMP claims to focus on analyzing the key factors that influence the quality of education in order to orient the education policy to reality and provide the essential reform direction. The tendency that a large-scale assessment is used as a policy instrument rather than merely a scientific research has emerged in China. Regarding the content of evaluation, PISA adopts the concept of "literacy", which refers to the ability of students to use knowledge and skills, analysis, reasoning and effective communication in various situations [8]. This is also a critical value orientation of the educational goal. China's monitoring has absorbed PISA's "literacy-orientated" evaluation, and has set up a number of ability indicators in each discipline, rather than merely investigating students' knowledge of the discipline. Taking Mathematics as examples, PISA and CEQMP have similarities in indicators. (See Table 2) Especially, they separate mathematics into several mathematic domains, and they both aim to examine student's ability of problem-solving [9].

Table 2 PISA's and CEQMP's indicators

Academic Performance	
PISA Indicators	CEQMP Indicators
Mathematical processes <ul style="list-style-type: none"> ● Formulating situations mathematically ● Employing mathematical concepts, facts, procedures and reasoning ● Interpreting, applying and evaluating mathematical outcomes 	<ul style="list-style-type: none"> ● Arithmetic ● Geometry ● Data Analysis ● Reasoning ● Problem Solving
Mathematical content knowledge <ul style="list-style-type: none"> ● Change and relationships ● Space and shape ● Quantity ● Uncertainty and data 	
Contexts <ul style="list-style-type: none"> ● Personal ● Occupational ● Societal ● Scientific 	

The value of "lifelong learning" can be considered as an expansion of "literacy" because the cultivation of their ability to solve practical problems is a long-term process. As PISA requires students to provide the information about their motivation for learning, self-belief and learning strategy to monitor the dynamic process of lifelong learning [8], CEQMP also aims to record and analyse the development process of students to assist policy-making. "Regularity" refers to establish a circle of assessment, which allows countries to track their progress in key learning objectives [8]. PISA is a three-year cycle, and each cycle has a core domain which needs to be tested in detail, accounting for about half of the total testing time. As in 2000 and 2009, the main area of 2018 is reading. Mathematics was the foremost field in 2003 and 2012, and in 2006 and 2015 the main domain was Science. Based on

PISA, China's monitoring is also a three-year cycle, and it also chooses to monitor two main disciplines every year. Specifically, it monitors mathematics and P.E. in 2015, language and art in 2016, and science and moral education in 2017.

However, in order to meet the request of the Chinese education system, expect learning PISA frameworks, CEQMP also developed indicators and tools according to China's curriculum standards. Actually, sticking to the old curriculum standards will hinder the future development of the programme. Moreover, as Table 2 shows, CEQMP's indicators only contain vague categories which lack explanation, which has negative effects on the normality of the programme and reducing the error in measurement.

3.2. Monitoring governance

PISA is developed and implemented under the responsibility of education ministries through PISA's decision-making body, the PISA Governing Board. The Board involves the OECD Secretariat, the PISA National Project Managers, International contractors, Education authorities, the PISA Subject Matter Expert Groups and the PISA Questionnaire Expert Group. Furthermore, the cooperation of students, teachers and principals is crucial to the success of PISA of its development and implementation as well. However, OECD does not have absolute power in governance. PISA is the product of cooperation between OECD and the governments of OECD countries and partner countries/economies [8].

Learning from the PISA's governance structure, the Education Steering Committee is mainly responsible for overall planning and policy guidance, and it authorizes The National Assessment Centre for Education Quality to lead the programme. This centre relies on Beijing Normal University, and reassemble many high-level universities. Its responsibilities include formulating the basic education quality monitoring indicators, developing basic education quality monitoring tools, carrying out the national basic education quality monitoring work, and providing technical support and guidance for localities. The provincial education supervision department is responsible for the organization and process supervision of the local

test, and the county-level education supervision department is responsible for organizing the assessment. Though CEQMP establishes an expert team inspired by PISA, by contrasting PISA and CEQMP in their organization, it can be concluded that PISA is organized a collaborative way, while CEQMP is a top-down assessment. This is because that PISA is initiated by an international organization, which is originally independent of governments, whereas CEQMP is conducted by the Chinese government. Furthermore, the power structure decides the state of transparency. For the reason of security and cost, CEQMP is only fully open with governments. In view of the opacity of CEQMP, it is hard to explore the whole programme in detail, which confines the views of improving the programme.

3.3. Monitoring method

In terms of the formulate of the test, CEQMP, as many international monitoring projects, has adopted the method of "test+ questionnaire survey", which not only evaluates the development of students but also explores the key factors affecting students' development. (See Table 3) Additionally, PISA's test items were a mixture of multiple-choice questions and open-end questions, with different students taking different combinations of test items. CEQMP' s test item also combines multiple-choice questions and open-end questions.

Table 3 PISA's and CEQMP framework of questionnaire

Questionnaire		
	PISA Framework	CEQMP Framework
Students' lives	Such as their attitudes towards learning, their habits and life in and outside of school, and their family environment	
Learning	Including students' interest, motivation and engagement	Motivation of Learning, Confidence of Learning, Anxiety of Learning
Schools	Such as the quality of the schools' human and material resources, public and private management and funding, decision-making processes, staffing practices, and the school's curricular emphasis and extracurricular activities offered	Popularity of Teachers, Education Degree of Teachers, Training Experience of Teachers, Internet Usage of Classes, Library Resources Equipment and Utilization, Multi-media Equipment, et al.
Instruction	Including institutional structures and types, class size, classroom and school climate, and reading activities in class	

In terms of evaluation technology, CEQMP draws on the experience of PISA in the design of matrix test book, measurement of test scores and cross-year equivalence, so as to achieve a more accurate assessment and report of students' literacy [10].

Though PISA provides good practice in education quality monitoring method, it is still questioned by more than a few people. Hopfenbeck et al. [11] reviewed 654 papers on PISA published between 2000 and 2015 and found that the criticisms of PISA mainly focus on the construction, design, data processing, questionnaire and technology of cognitive level. In other words, the model of "test+ questionnaire survey" contains many uncertainties. Therefore, the reliability and validity of CEQMP are also under questioning.

3.4. Monitoring process

PISA adopts strict technical standards for every stage of the assessment. In developing and implementing stage, PISA's assessment frameworks were developed by expert groups whose members come from various countries' universities, and then these frameworks were reviewed by a panel of experts from each participating country. Participating countries/economies implemented the system at the national level in accordance with agreed management procedures through national project managers. The sampling procedures require that the samples obtained and the corresponding response rate are subject to an

adjudication procedure to verify whether they meet the set criteria.

CEQMP also expects to ensure that the whole process is conducted normatively. In developing and implementing stage, there are about 300 domestic experts, international scholars, specialized personnel, principals of primary and secondary schools, and teachers of primary and secondary schools participating in and supervising CEQMP [12]. According to the NACEQ, the indicators had several rounds of pre-test and met the requirements of measurement [13]. In addition, CEQMP has formulated a strict and standardized schedule of data collection. The supervise experts are responsible for inspecting on the monitoring preparation of some provinces in China.

Both PISA and CEQMP claim to conduct the assessment in a strict way. However, there is no sufficient evidence or report proving that they are carried out completely according to the regulations.

3.5. Monitoring report

PISA promotes the application of result by providing the information and analysis as detailed as it can. PISA results not only report the data of students and school; it also focuses on statistically significant differences and comparison among countries/economies. For further analysis, PISA also publishes in-depth reports on education equity, teachers, employment et al. The centre also provides monitoring results reports for all participating provinces and sample counties every year and organizes the interpretation meeting of monitoring results reports, so as to help local personnel understand the monitoring data results and promote the application of monitoring results [13]. There are three types of result reports: raw data report, provincial monitoring report and national monitoring report. The basic data report mainly presents the original data summary. The provincial monitoring report mainly shows the performance and related influencing factors of students in relevant disciplines in each province. The national monitoring report mainly presents the overall performance of students in related disciplines and related influencing factors. However, only the national monitoring report is open to the public.

PISA results not only report the data of students and school; it also contains further analysis. Conversely, CEQMP national monitoring report, which is the only report that is open, merely presents the raw data and conclusion. Nevertheless, one of its aims is to change the public's view that the practice of taking the enrolment rate as the only standard, and a simple report cannot serve as a thought leader.

4. DISCUSSION

Currently, China used PISA as a "model" or "guide" for developing and adjusting national assessment policies and practices. This paper proposes an improved pattern that

CEQMP can follow in the future, that is "go into and beyond PISA". This means that China should not only use PISA as a guide into details, particularly but also need to try to surpass it.

4.1. Go into PISA

4.1.1. Governance and process

PISA is open to everyone in the world, and this maximizes the use of PISA data. China can also try to establish an open database of CEQMP. It may be doubted that important data in CEQMP should not be accessible for the sake of security and privacy, but the whole process of CEQMP must be transparent to ensure the accuracy of the assessment. This can be realized by setting up an independent supervisory institution, opening the report of the process, and gather complaints from the public.

Moreover, for long-term improvement, CEQMP can try to turn a top-down structure to an interdependent structure. To be specific, CEQMP needs to establish a monitoring agency which is independent of the administrative system and collect the voices from society. Getting more voices involved can boost more CEQMP-based academic researches, which also can cultivate professional educational quality monitoring team in the future.

4.1.2. Indicators

PISA will publish its framework report every cycle, which not only contains the explanations of each indicator but also demonstrate the process of developing and verifying the indicators. The specific meanings of indicators in CEQMP need to be developed further as PISA, especially the indicators that aim to promote students' lifelong and all-round development. CEQMP should also publicize its process of developing the indicators. This can help to improve the normality of the programme and reduce the error in measurement.

Since part of CEQMP indicators come from national curriculum standards in China, China should not only refine the indicators of CEQMP but also need to use CEQMP's information to reform the basic education curriculum standards.

4.1.3. Results presentation

It is an urge for CEQMP to carry on a further analysis into the original data, not only for governments but also for academics and the people. CEQMP should try to establish a complete monitoring results report and analysis, which can include comparisons between provinces and areas, in-depth interpretations of results, the relation between students' characteristics and academic outcome et al.,

because equality, student life, learning environment are also the concerns of society.

Furthermore, China should also highlight the main findings in the programme, especially findings in Sports, Arts and Moral education, in order to change the public's view that practice of taking the enrolment rate as the only standard.

4.2. Go beyond PISA

PISA is never the perfect model to follow, but PISA is a line that illustrates the direction should be worked on. CEQMP need to realise the current problems in PISA and try to avoid recommitting them. Unfortunately, problems occurred in PISA is also occurring in CEQMP. CEQMP does not aim to be China's version of PISA but to become a better monitoring system which is suitable for China.

There are mainly two points that CEQMP can try to advance PISA. First, in terms of assessment method, apart from matrix test book, scaling of test scores and cross-year equivalence technique, China can turn to other assessments and encourage new research programmes which aim to develop more reliable methods.

Secondly, it is also argued that PISA overemphasises the relevance of education reform and economic development. The scope of economic development refers not only to "economy" but also to cultural practice [14]. The propose of monitoring education and the concept of high-quality education is what China should rethink. In future monitoring, apart from the national economy and education outcome, students' own development and other essential elements should be considered as key aspects.

5. CONCLUSION

In this paper, the central questions are "What is the patterns of China learning from PISA in education monitoring?" and "What improvements should be done in the patterns of China learning from PISA in education monitoring?" After analysis the PISA and CEQMP on value, governance, method, process and result, this paper found that PISA has both explicit and implicit influences on CEQMP, especially in these aspects. China absorbed "policy orientation", "literacy", "lifelong learning" and "regularity" into its education monitoring system. Learning from the PISA's governance structure, the formulate of the test, and the evaluation techniques and the results reports, CEQMP takes shape tentatively.

Still, the programme has numbers of problems to be solved, which include governance, process, indicators design, and results presentation. PISA can be used as a guide in improving these issues. For future development, this paper proposes a pattern: "go into and beyond PISA". CEQMP need to become a better monitoring system which is suitable for China but not a new version of PISA.

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