IJSSHR

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

The Mathematical Assessment of Teaching Methods in the Classroom: Results from a Leading Chinese Educational Community's Research

NUENYIYA[1], DR. MIDHUNCHAKKARAVARTHY[2a], DR NIDHI AGARWAL[3b]

[1]PhD Research Scholar in Applied Science, Lincoln University College, Malaysia
[2,3] Professor in Lincoln University College, Malaysia
Contact Details: [a] midhun@lincoln.edu.my, [b] dr.nidhi@lincoln.edu.my

Abstract

Taking into account the, "Very few studies have been conducted on how children learn mathematics because of the political environment in China up until the 1980s. Second, despite Western scholars' interest in understanding the reasons behind Chinese students' remarkable success in mathematics, studies on how students learned the subject have been limited since the 1960s (Wong, 1998; Leung, 1992). in mathematics. Recent years have seen a large number of international conferences attended by Chinese math teachers, but few studies on the subject—particularly those involving students from Mainland China—have been published in foreign journals. Math instruction in Shanghai, a modern city with close ties to Chinese culture, and in Hong Kong, which has always been influenced by both long-standing Chinese culture and imported Western values, both conceptually and practically, are fascinating to compare and contrast. According to Stigler and Hiebert (1999), teaching has cultural significance. In addition to contributing to a better understanding of mathematics classroom instruction in the two locations, the current study has the potential to shed light on Chinese mathematics pedagogy. Reiterating the variation theory of education, "whose original focus was on the learning process, it has only recently been applied to studies of classroom teaching. Such an attempt at a national survey of math education in China has never been made before. The application of this concept in formal educational settings will enhance it. A thorough comprehension of the methods used in mathematics classrooms in Shanghai and Hong Kong will be a great help when implementing the reforms in these two cities, where "a number" of modifications have been "adopted in mathematics education "cities."

Keywords: Theory of Education, Chinese Mathematics Pedagogy, Mathematics Pedagogy.

INTRODUCTION

Southeast China is where Hong Kong's territory is located. Within a single square kilometer, there are 6.5 million people living there. At market prices, the per capita GDP in 1999 was 183,000 HKD, or 23,000 USD.

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

Shanghai, the capital of the People's Republic of China (PRC), is one of the main cities in the nation. The East Sea is where the Long River Delta empties into. Situated within an approximate 6,000 square kilometer area, the population of 13 million individuals represents nearly 1% of China's total population. In 1999, the GDP per person was 3,600 USD, or 30,000 RMB using today's exchange rates.

All children in Hong Kong are eligible for free public education for nine years, beginning at the age of six. Three years of junior high school and six years of elementary school make up this program. The six-year senior secondary school phase and a year of university preparation follow. For most students, grade 9 is the last year of compulsory education. Of those students, very few will pass the Hong Kong Certificate of Education Examination (HKCEE) to complete their education. Students must pass the Hong Kong Advanced Level or Advanced Supplementary Level Examinations—available only to those who perform well on the HKCEE—in order to apply to universities in Hong Kong.

In Shanghai, schooling officially starts when a child is six years old. They will have to spend nine years in school. Two categories exist. private and public sectors of education. Primary, middle, and high school are separated into three separate levels: "5-4-3," "5-4-2," and "5-4-1." Another option is the "6-3"3" system, which consists of three years of junior high school, three years of high school, and six years of elementary education. Since the middle of the 1980s, the neighborhood approach has been utilized for elementary school enrollment. The same method is used to advance students to the secondary level. This suggests that the admission to elementary and junior secondary schools does not involve a public exam. In order to determine their level of proficiency, students must take a public exam during their final year of mandatory education. Based on the results of this exam, students will be assigned to a variety of senior secondary schools, including the comprehensive senior secondary school. (which comprises "key" and regular schools) as well as technical colleges. a) Following three years of high school, students are required to sit for a public exam called the Shanghai "Certificate of Senior Secondary." Students who want to "continue their education at a university" must also pass the Entrance Test for Universities, which is another open exam.

REVIEW OF LITERATURE

(Beaton et al., 1996; Husen, 1967; Lapointe et al., 1992; Mullis et al., 1997, 2000; Robitaille., 1989; Stevenson et al., 1992;. 1993)" East Asian students "consistently exceed their Western counterparts in math." For instance, Singaporean, Korean, Japanese, and Hong Kongan students in primary and secondary schools ranked in the top four for mathematics achievement in the Third International Mathematical and Science Study (TIMSS) (Beaton et al 1996; Mullis et al 1997).

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

Despite not taking part in TIMSS, Chinese students performed better in mathematics than their Western counterparts. For instance, Chinese students placed first globally in the 1992 IEAP Mathematics Study (Lapointe et al, 1992). Champions of the International Math Olympiad since 1990: They have triumphed annually since then (Wong, 1998).

Conversely East Asia was found to have high class sizes, an examination-oriented curriculum, teacher-centered teaching techniques, and what "Western studies have discovered to be favorable to learning" (Biggs, 1994; Leung, 1995, 2001; Morris, 1985; Morris et al., 1996; Wong, 1998, 2000). Several researchers (Garden, 1987; Lapointe & Co., 1992; Lee, 1998); Leung, 1995; Schmidt et al. 1997; Stigler & Stigler, 1992; Stevenson & Stigler, 1993; Watkins & Biggs, 1996) have been drawn to look into the reasons behind East Asian students' higher arithmetic scores. Some people think that factors like cultural values and curriculum have an impact on children's academic success or failure. Stevenson and Lee (1992) state that in East Asia, the social and cultural norms that place a strong emphasis on education, attribute success to hard work, and encourage family involvement in their children's academic pursuits all play a part in the students' outstanding academic achievement.
Moreover, according to Schmidt et al. (1999), TIMSS "statistics suggest that East Asian countries have more unified and centralized mathematics exams, textbooks, and syllabuses than Western countries." East Asian textbook publishers have followed the syllabuses, in contrast to American textbooks that were "a mile broad and an inch deep" and subject to "redundancy and revision" (Schmidt et al 1999, p.56). According to a 1999 study by Ma, US teachers normally received 16–18 years of formal education, whereas Chinese teachers typically received 10–12 years of formal education, including teacher training. It was proposed that the instructor's intellectual level had an inverse relationship with the effectiveness of instruction. Ma's (1999) research indicates that while Chinese math teachers received less training, they were able to apply effective teaching strategies and had greater subject-matter expertise. Leung (2001) has called for a search for an East Asian identity in mathematics education, citing a wealth of literature that highlights the differences and similarities between East Asia and the West in terms of traits and ideals.

The International Commission of Mathematical Instruction (ICMI) Committee's current focus is "mathematical education in many cultural traditions."

Graf and Leung (2000) "analyzed East Asia and the West in comparison. It is evident that the previously mentioned studies are crucial to understanding why East Asian kids do so well in mathematics. studies comparing math instruction in East Asian and Western classrooms have previously been disregarded. According to Cobb (1994, cited in Lee, 1998), classroom environments and teachers play a crucial role in assisting students in developing their mathematical

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

conceptions. Researchers have worked hard to include Chinese students in their studies of mathematics instruction in other cultures (Stevenson & Stigler, 1992; Leung, 1992; Hiebert, 1999; the ongoing TIMSS-R Video Study), but these studies have frequently left out Chinese students in Mainland China.

This has led to discrepancies in some studies' findings and "descriptions of math classes in the classrooms of students from Mainland China." Paine (1990) and Morris et al. (1996) claimed that Chinese students had a negative learning style. On the one hand, Lee (1998) and Mok and Morris (2001) On the other hand, we found that Chinese pupils were constructive learners. According to certain studies, Chinese teachers even favored a methodical approach to teaching and solving problems (Lee, 1998; Stevenson & Stigler, 1992). This was contradicted by numerous other findings (Paine, 1990; Morris et al., 1996).

PROBLEM DESCRIPTION

Lesson organization, classroom interaction (Leung, 1995; Stevenson and Stigler, 1992; Stevenson, 1995), and general classroom characteristics have all been disregarded in the majority of research to date; the qualitative aspects associated with teaching have always been disregarded. How teachers approach a single topic and related topics in a math course has not been the subject of many studies. Looking at teachers' qualitative approaches to specific mathematical concepts is crucial, according to the researcher, in order to understand what transpired in a math classroom. It might also shed light on the quirks of mathematics education in China. Studying the complexity and messiness of classroom teaching from a variety of viewpoints and paradigms is possible, given that classroom teaching is more complex than first thought.

To focus this study, the researcher employs the next two techniques. The Pythagorean Theorem was selected as the course's main topic, and all of the lectures were built around it (for more information, see Chapter 4). Using the variation theory of learning as a theoretical framework, classroom instruction could be analyzed (Bowden and Marton, 1998; Marton and Booth, 1997). Children can never learn to identify anything without first coming across a particular pattern of variation, according to this theory. We were able to make deductions using a sample of eight-grade arithmetic" courses on Pythagoras.

The researcher in Shanghai and Hong Kong is attempting to investigate various facets of mathematics education through a theoretical framework. The researcher decided to concentrate on lessons from two different cities due to a number of factors, some of which are listed below: The TIMSS series—which includes the TIMSS-R and TIMSS-R Video Study projects—allows us to now analyze Hong Kong's mathematics education from a global perspective. The TIMSS-R Video Analyze in particular has provided an abundance of data for the investigation of mathematics

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

classrooms in Hong Kong. Data from the TIMSS-R Video Study were selected by the researcher based on a set of criteria in order to represent Hong Kong in the current study. Some research on Shanghai's mathematics education can be found in previous studies (Ma, Gu, and Paine, 2002, for example). Given that Hong Kong spent more than 150 years as a British colony, this era of British rule has influenced the educational system in all facets of life. Hong Kong has maintained its cultural ties to China since almost all of its population is Chinese (Census and Statistics Dept., Hong Kong, 1997). Hong Kong is characterized as an international metropolis with cultural significance that combines Western and Chinese traditions. Beaton et al. (1996) and Mullis et al. (1997) report that students in Hong Kong think differently about mathematics than do their Western counterparts. Though Hong Kong educators view the aforementioned issues differently than do educators in London (Leung, 1992), it is surprising that "Hong Kong educators share similar opinions on these difficulties with teachers in Beijing.

Among "China's most technologically advanced metropolises" is Shanghai. Shanghai has developed into a modern Chinese metropolis with a distinct Chinese flavor despite its population, political structure, and economic institutions since the adoption of reform and the opening of the Western door in 1978. By comparing the teaching strategies employed in Shanghai and Hong Kong classrooms, the Shanghai case study can be used to investigate some aspects of mainland Chinese education. Furthermore, a worldwide viewpoint can be obtained through an analysis of the Hong Kong circumstances. The goal of this study is to improve Chinese students' understanding of the classroom setting. The third difference between Shanghai and Hong Kong is that Shanghai is one of China's most advanced cities on the continent. As such, Hong Kong and Shanghai are comparable in terms of school infrastructure and funding. Lastly, the researcher considers "feasibility."

Gaining a "understanding of the patterns of variance experienced by students in Hong Kong and Shanghai's mathematics" classroom, the study's main goal.

What are "the patterns of variance for students to experience the object of learning similar and different in Hong Kong and Shanghai's mathematics" classrooms, according to the research questions?

RESEARCH DESIGNATION

Koehler and Grouws (1992) assert that education is not only more complex over time than previously thought, but it is also harder than previously thought. Numerous scholarly perspectives and inquiry frameworks can be used to examine the intricacy and messiness of classroom instruction (Teppo, 1998). Some, like Thompson (1992), Aguirre and Speer (2000), Fennema and

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

Franke (1992), and Ma (1999), would rather examine the relationship between teaching practice and teacher variables like topic and pedagogical knowledge and beliefs. Following this stream, Schoenfeld (2000) created a more comprehensive model of classroom instruction that addressed the relationship between the goals, beliefs, and knowledge of instructors as well as the choices and actions made by educators. However, a number of studies (Koehler & Grouws, 1992; Cobb & Whitenack, 1996; TIMSS-R Video Study) only address teaching practices in general. The TIMSS-R Video Study, which has significantly advanced our knowledge of cross-cultural science and math instruction in classrooms, has continued this tradition.

RESEARCH DESIGN

The classroom is a place where many different aspects interact with one another, rather than just being a place where the instructor performs planned regular tasks. A class's flow and effectiveness are greatly influenced by the dynamics between the teacher and students (Tsui, 1995). Studies of classrooms have a long history and have been conducted from a number of perspectives. An observational tool featuring Previous classroom research primarily used quantitative approaches and typically used preset categories for coding classroom data 72. In contrast to "quantitative" approaches, more recent research has focused on qualitative approaches that address the relationship between the teaching and learning processes in the. Classroom.

DATA ANALYSIS

TRVS "Casettes will be sent to a laboratory for additional analysis after transcription. The recordings will be combined with scanned files of supplemental materials, such as instructor and student surveys, once they have been digitalized and saved in a multimedia database. As soon as the movies are digitized, time codes will connect the transcribed courses to the relevant movies in the multimedia database. After that, bilingual math teachers who are fluent in English will transcribe the conversations between both the instructor and the pupils. To ensure a high degree of coding reliability, we will extensively test the inter-rater reliability of codes across coders. Programmers can access the linked text and video instantly by using the v Prism multimedia database system. This facilitates obtaining the background knowledge required to decipher the transcript (Stigler, 1998).

CONCLUSION

As far as I can tell, "In larger Chinese classrooms, teachers emphasize the importance of exploring activities, justification exercises, and a wide range of exercises, and they pay special attention to how these strategies might best engage their students in the learning process." Thus, it is suggested that the complexity of mathematics education in Chinese be reexamined. It was also demonstrated that differences between Mainland China and Hong Kong complicate research into Chinese

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

mathematics education and that such research should be done cautiously due to these differences.

LIMITATIONS

This study has a number of "limitations, including the fact that time and money restrictions will only allow for a small-scale implementation." Consequently, the Theoretical framework and prior experiences of the researcher may have an effect on the current study's objectivity in analysis and interpretation.

REFERENCES

1. Alexandersson, M, Huang, R.J., Leung, F., &Marton, F.(2002, April). Why the content should be kept invariant when comparing teaching in the same subject in different classes, in different countries. Paper presented in American Educational Research Association Annual Meeting, New Orleans, USA.
2. Cai, J. (2000). Understanding and representing the arithmetic averaging algorithm: An analysis and comparison of U.S. and Chinese students' responses. International Journal of Mathematical Education in Science and Technology, 31(6), 839-855.
3. Cai, J. (2001). Improving mathematics learning: Lessons from cross-national studies of U.S. and Chinese students. Phi Delta Kappan' 82(5), 400-405.
4. Clarke. D.J. (2001). Perspectives on practice and meaning in mathematics and science classroom. London: Kluwer Academic Publishers
5. Clarke, D.J. (2002, April). The leamefs perspective study: Exploiting the potential for complementary analyses. Paper presented at American Education Research Association Annual Meeting, New Orleans, USA.
6. Cortazzi, M. &Jin, L.(2001). Large class in China: "Good" teachers and interaction. In D. A. Watkins & J.B. Biggs (Eds), Teaching the Chinese learner: Psychological and pedagogical perspectives (115-134). Hong Kong/Melbume: Comparative Education Research Centre, the University of Hong Kong/ Australian Council for Education Research.
7. Education Department (200()). Report on holistic review of the mathematics curriculum. Hong Kong
8. Gu, L.Y. (2001, December). Variations among difTerent kinds of learning. Paper presented at symposium entitled "variation, teaching to learning, lesson studies" in The University of Hong Kong
9. Hanna, G. (2001). Proof, explanation and exploration: An overview. Educational Studies in Mathematics, 44, 5-23

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

10. Huang, R., & Leung, F.K.S. (2002). Is there a Chinese approach?—A comparison on the ways of teaching the Pythagoras theorem among Australia, Czech Republic, Hong Kong and Shanghai. In D. Edge & Y.B. Har (Eds.). Proceedings of the Second East Asia Regional Conference on Mathematics Education and Ninth Southeast Asian conference on Mathematics luJucation, Vol. 2, 247-252. Singapore: Association of Mathematics Educators & National Institute of Education, NTU
11. Jiang. F. L. (2000). Yitiduobian you liuyupeiyangxueshengchuang/aoxingsivvei (Cultivating students" creative thinking by varying around one problem). ShuxueJianxueTongmn
12. Johnson B., & Christensen, L.(20()0). Education research: Quantitative and qualitative approaches. Boston : Allyn and Bacon
13. Knuth, E . (2002). Teachers' conceptions of proof in the context of secondary school mathematics. Journal of Mathematics Teacher Education 5, 61-88.
14. Ko.P.Y. &Chik, P.M.(2000). Jiaoxuejihue de bawu he liushi [The grasp and loss of teaching and learning opportunities- Lesson analysis of a primary Chinese language lesson], Asia Pacific Journal of Language in Education
15. Leung, F. K. S. (2001). In search of an East Asian identity in mathematics education. Educational Studies in Mathematics, 47, 35-51
16. Leung, F.K.S. (2002, May). Why East Asian students Excel in Mathematics?— Characteristics of High Achieving Classroom. In D. Edge & Y.B. Har (Eds.). Proceedings of the Second East Asia Regional Conference on Mathematics Education and Ninth Southeast Asian conference on Mathematics Education, Vol. 1, 127-131. Singapore: Association of Mathematics Educators & National Institute of Education, NTU
17. Lu, J. C. (2001). Zhongshibianshijiaoxue,peiyangsiweinenli [Emphasizing teaching with variation, cultivating thinking ability]. ZhongxueShuxueYuekan ,
18. Mok, I. A C., &Ko, P.Y. (2000). Beyond labels - Teacher-centered and pupilcentered activities. In B., Adamson. T., Kwan, & K. K. Chan (Eds.). Changing the curriculum: The impact of reform on primary schooling in Hong Kong (pp. 175-194). Hong Kong: Hong Kong University Press
19. Ng. D. F. P., Tsui, A. B. ML &Marton, F. (2001). Two faces of the reed relation'- Exploring the effect of the medium of instruction. In D. A. Watkins & J.B. Biggs(Eds), Teaching the Chinese learner: Psychological and pedagogical perspectives{ 135-160). Hong Kong/Melbume: Comparative Education Research Centre, the University of Hong Kong/ Australian Council for Education Research
20. Ng. F.P., Kwan? Y.L., &Chik, P.M.(2000, June). Yi tang \ia\ueyuweike de fenxie—-Xianxiangtushixu [Lesson analysis of a primary Chinese language lesson-phenonmenography approach]. Curriculum Forum.

Available online at www.internationjournalofsocialscience.com
INTERNATIONAL JOURNAL OF SOCIAL SCIENCE AND HUMANITY RESEARCH
E ISSN: 2689 3525
Volume:07; Issue:01 (2024)

21. Paine, L. (2002, April). Learning to teach through joining a community of practice in Shanghai: Curriculum control and public scrutiny of teaching as context for teacher learning. Paper presented at the American Education Research Association Annual Meeting, New Orleans, USA
22. Park K., & Leung, F.K.S. (2002). A comparative study of the mathematics textbooks of China , England, Hong Kong, Japan, Korea and the United States. Preconference proceedings of the ICMI comparative conference (pp.225-234). 20th-25th , October, 2002. Faculty of Education, the University of Hong Kong. Hong Kong SAR, China
23. Perry, B., Wong, N.Y., & Howard, P. (2002). Beliefs about mathematics, mathematics learning and mathematics teaching: A comparison of views from primary and secondary mathematics teachers in Hong Kong and Australia. Pre-conference proceedings of the ICMI comparative conference (pp.151-158). 20th-25lh , October, 2002. Faculty of Education, the University of Hong Kong. Hong Kong SAR, China.
24. Schoenfeld, A. (2000). Model of the teaching process. The Journal of Mathematical Behavior, 18(3), 243-261.