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Comparison of Chinese High School Math Education Objectives in the Traditional Chinese Education System and International Education System

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Abstract: The growing trend of Chinese students opting for international education has highlighted the discernible disparities between mathematics teaching in traditional Chinese schools and their international counterparts. While the variations in teaching methods have been extensively studied, there exists a dearth of information regarding the fundamental objectives that drive educators within these two distinct systems. Consequently, to scrutinize and contrast the teaching goals of Chinese high school mathematics teachers within the traditional Chinese education system and those operating within the international education framework, researchers will undertake a qualitative, semi-structured interview approach. In this method, carefully selected participants will be engaged purposefully to provide insights into their teaching experiences and the core objectives that underpin their pedagogical practices. By delving into the motivations and intentions of these educators, this study aims to shed light on the nuanced differences in the educational goals and aspirations of mathematics teachers in these divergent educational contexts.

Keywords: Pedagogy, Chinese education, Western education, education objective

1. Introduction

1.1. Background

In recent years, with the backdrop of globalization development, studying abroad has become increasingly common. In fact, data from 2019 shows that the number of Chinese students exit China to pursue overseas studies is around 703,500, which increased by 6.25 percent than the previous year.[1] In China, many students opt to attend international high schools instead of local ones within the Chinese education system, seeking to evade the highly competitive environment of the Chinese Gaokao. The traditional, domestic environment is so competitive that only students who rank within the top 5% in Shandong can gain admission to esteemed institutions such as Shandong University.[2] Thus, it is not surprising to see Chinese high school students find ways to get out of this education system and choose to go abroad. Consequently, the number of international high schools established in China is increasing, and data shows the number of international schools in China had doubled and reached 821 from 2010 to 2019.[3] In general, the two systems have different goals: Chinese local high schools aim to help students to be more competitive for their Gaokao, therefore holds

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significance in nurturing the fundamental academic base of students.[4] On the other hand, international high schools aim to "globalize" their students and prepare them to compete with foreigners, thus the goals might be similar with that of Western education system, which is to cultivate students' creativity, teach students to criticize ideas, and create concepts.[5] Affected by the general goal, the objectives of teachers might be different under the two systems. Among all the subjects, goal difference of math teachers might be very significant because the stereotype of "Chinese are good at math" is prevailing in the US, and even young children notice it.[6] Thus, this study examines the contrast between the objectives of Chinese high school math educators in the traditional Chinese educational framework and the global educational system.

1.2. Literature Review

The studies had taken research on the local teaching ways and finding differences in the goal. In the passage "A brief analysis of cultural differences between China and the West" [7], the author discussed the influence of different social cultures and communities. The author thinks International education has a tight emphasis on moral and self-discipline ability and Chinese traditional education is more focused on the repeat of knowledge and the large amounts of examine mock to prepare for the biggest test—Gaokao. The passage has considered the social factors that affect the difference.

Researchers also find that it's an important factor that the method of education can affect the difference in education "The Differences between Chinese and Western Education" [8], the authors compare the difference between to education system on the model of behavior: the difference in teaching mode, the difference in family education, the difference of the methodology of the education process. This passage has thoroughly explained the basic difference between the two systems and the basic reasons for the differences. This qualitative study examines China's school system for a deeper understanding. In another research [9], the results of the questionnaire showed that teachers in Beijing, Hong Kong, and London differed greatly in their attitudes toward mathematics and mathematics education. Through classroom observations, it was found that teachers in the three places differed in their classroom teaching, and analysis of selected topics from textbooks revealed that students in the three places learned very different mathematics in the classroom.

Moreover, the researchers find that history, cultural, and societal differences can also be the factors that cause differences to occur in different systems. In "The Differences between China and the West from classroom debate" [10], the author has not only mentioned the points the other passages have mentioned but also emphasized the history factor which has a big impact on the class style. Qianhui thinks that China, as the country has the longest cultural inheritance, makes a lot of effort to let students become the successor of the traditional culture. But the Western classes are more focused on "exploration" and "innovation", which means they want students to invent new things completely based on themselves, but not based on traditional ideas.

1.3. Research Gap

As researchers found in these previous essays, the predecessors have found many perspectives on the reasons for the differences between the Chinese education system and the Western education system: the cultural factors, the historical factors, the thinking mode, and the social influence. However, researchers can't conclude whether the teachers have the different goals in the two systems. As a result, the research is going to find a clearer conclusion toward it.

2. Theoretical Framework

In the study, researchers have made hypothesis that the traditional Chinese education system will primally use the behaviorist's idea, and the people in the international education system usually use

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the views of the cognitivist. As witnesses to both systems, researchers can provide a somewhat overview of the two systems. In the traditional Chinese system, students are given a very clear target—have a good grade in the Gaokao. The whole system is serving this goal, and in the process, the rules are kept strictly for reward and punishment: The failure of an exam is not acceptable, and a good grade in the exam deserves praise. The most famous and classic example is the Hengshui Highschool in Hebei province. The educator there uses extreme exercise and strict rules to train experts in Gaokao. The Chinese education system is emphasizing the repeating of memory, but not creativity and critical thinking. Researchers supposed that this is because the base of the system is to let student change their behavior, which means getting a better grade, rather than letting students understand the knowledge. This fits in with the idea of behaviorists that "the learning can be observed by the change in actions." Even the last test—Gaokao is also a reinforcement and punishment mechanism: The bad score students will have a much harsher life than those students who got good grades. The whole system is linked with behaviorism influences. As a result, researchers think the mode of the traditional Chinese system is based on behaviorism, and researchers will construct interview and conclusion of the Chinese traditional system on the base of behaviorism.

On the other hand, the international system has very different fundamental conditions. Take IB course as an example. From subject exercise to essay writing, the subject studying requires various abilities. On the IB official website, the goal of the math class is: "develop mathematical knowledge, concepts, and principles; develop logical, critical and creative thinking; employ and refine their powers of abstraction and generalization." [11] In all, the IB wants the studier to develop the habit of studying in the process of IB studying and become a lifelong learner. Researchers want to use the cognitivism theories, which in the opinion, the "lifelong study" is the process of keep reminding themselves to keep studying. Much of the subject learning is closely related to lifelong study, and each of the IB courses is emphasizing this content. As a result, researchers have made the hypothesis that the objective of international education system teachers will be more based on the cognitivism theory.

Moreover, researchers will fuse the two theories with ecological theories of learning at the data analysis stage since researchers need to consider the different systems that have been placed in different political and cultural environments, the difference in the environment, and its influence on the students.

3. Research questions

As students who experienced both Chinese education system and Western education system, researchers realized there is a big difference among the goals of teachers in the two systems. Take math teachers as examples, Chinese math teachers teach knowledge that aimed to get higher scores in tests, while Western math teachers aimed to teach knowledge that can greatly blend in students' daily life. It is important to do the research about the difference of the objectives in the Chinese and Western education system, because after understanding the goal difference among different culture, it will be easier and more accurate for schools to make modifications. Thus, the research question is:

What is the difference of Chinese high school math teachers' objectives in the traditional Chinese education system and international education system?

4. Methods

4.1. Methodological Approach

A qualitative research approach has been selected to investigate the objectives of Chinese mathematics educators within both the traditional Chinese educational framework and the international education system. Qualitative methodologies enable a thorough examination of

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participants' perspectives, enabling a nuanced comprehension of the subject being studied. Moreover, since the goals of math teachers are very subjective and might differs subtlety, it is difficult to use quantitative methods in the research. Thus, a qualitative semi-structured interview can perfectly serve to record the different objectives of math teachers in the two systems and making it easier for researchers to analyze the result.

4.2. Sampling & Participants

Researchers will do research on the Chinese math teachers in both traditional Chinese high schools and international high schools. To be more specific, researchers will focus on the teachers that have taught for more than five years and take the job of department chairman. Researchers set requirement on the teaching ages because, compared with new teachers, teachers with long teaching ages have deeper and more comprehensive understanding on the teaching system they are in. Moreover, researchers will invite the chairman of math department chairman because they are the ones who decide the teaching goals for the rest of the math teachers at that high school, in other words, their teaching objectives directly shape that of the other math teachers. Thus, doing interviews on math department chairman is a comprehensive and representative way to understand the goals of math teachers in the two system.

Researchers will do semi-structured interview on 10 Chinese math teachers in total: five from each system. If researchers choose too less teachers to research, the result would be unlikely to represent all the Chinese high schools. On the other hand, it would be impossible to interview too many teachers since researchers have only two members in the group.

The type of sampling process to find participants will be purposive sampling. As mentioned previously, participants of this research will be Chinese math teachers who have the teaching age greater than five years and take the job of the chairman of math department in both traditional Chinese high schools and international high schools. The reason why researchers will use purposive sampling to find experienced and influential math teachers is that it can help us to have a more comprehensive and deeper understanding about the two education systems, and then better compare them.

4.3. Data Sources

Information will be gathered via semi-structured individual interviews with each participant. To be more specific, researchers will talk with participants about the following aspects: their individual background information, the experiences of them setting teaching objectives and what make them set these objectives. The outline of the semi-structured interview refers to the appendix. The form of semi-structured interview offers adaptability, allowing participants, the math teachers, to openly convey their experiences and teaching goals, while ensuring consistent coverage of research inquiries throughout all interviews. Moreover, Semi-structured interviews offer a flexible framework that allows both the interviewer and interviewee to explore topics in-depth while also accommodating unexpected insights or tangents.

4.4. Data Analysis

Researchers will use thematic analysis to analysis the data, which is grouping the data according to themes. In this research, researchers can find the themes, which is the shared similarities, of the math teachers' objectives in different systems, and then easily compared them with each other.

Two researchers will independently carry out the analysis to ensure accuracy and minimize potential biases. Regular discussions will be held between them to arrive at a mutual agreement.

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4.5. Limitations

As with any research, this study has some limitations listed below:

1) Since the data are collected by a qualitative semi-structured interview, and there are only ten participants in this study, the work might not be generalizing enough to all Chinese high school math teachers.

2) The utilization of self-reported data may be susceptible to participant predispositions or inaccuracies in recollecting memories.

3) The answers from the participants might not be true because of individual concerns, like to beautify their teaching methods, goals, and experiences.

5. Conclusion

This study delves into the comparison of Chinese high school math teachers' objectives in the traditional Chinese education system and the international education system. By examining the contrasting approaches and goals set by math teachers in these two educational settings, researchers aim to gain insights into the strengths, weaknesses, and potential areas of improvement in both systems. Understanding the variations in objectives and teaching methods is essential to facilitate meaningful cross-cultural exchanges in education and to enhance math education practices on a global scale. Through this comparison, researchers strive to shed light on the diverse perspectives on mathematics education and contribute to the ongoing efforts to refine teaching methodologies for fostering effective learning experiences among students in diverse educational environments.

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Appendix

The outline of the semi-structured interview:

1) Ask about the participants' background, like teaching age and their specific job at school.
2) Ask the participant to talk about their experiences of setting teaching objectives and what triggers them set these objectives.
3) Ask participants about what benefit, or student competency, will their students gain when they are trying to attain the teaching goal. For example, critical thinking skills, leadership ability, or academic performance.
4) Ask the teachers what talent they have to achieve their education objectives.