



A Comparative Study of the Content of “Circle” —Taking “People’s Education Press” and “Beijing Normal University Press” Primary School Mathematics Textbooks as Examples

Yuhan Li, Chenglin Luo

Faculty of Education, Elementary Education, Zhejiang Normal University, Jinhua, China

Email: liyuhan972021@163.com

How to cite this paper: Li, Y.H. and Luo, C.L. (2024) A Comparative Study of the Content of “Circle”. *Open Access Library Journal*, 11: e11806.

<https://doi.org/10.4236/oalib.1111806>

Received: June 8, 2024

Accepted: July 28, 2024

Published: July 31, 2024

Copyright © 2024 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

In this paper, qualitative and quantitative methods are used to compare and analyze the content of “circle” in primary school mathematics textbooks published by People’s Education Press and Beijing Normal University Press from three aspects of textbook content arrangement, exercise setting and mathematical culture, including the order of content presentation, the process of knowledge introduction and the number of knowledge points. By comparing the content arrangement, it is found that the knowledge points of the People’s Education Press are more abundant, while the Beijing Normal University Press pays attention to the cultivation of reasoning and inquiry ability. By comparing the setting of exercises, it is found that the People’s Education Press pays more attention to the connection between knowledge points, while the Beijing Normal University Press pays more attention to students’ understanding of the essence of knowledge. By comparing the mathematical culture, it is found that the two versions of textbooks both present interesting mathematical culture content, but the Beijing Normal University version has a higher level of application of mathematical culture, while the People’s Education version mainly provides situations and backgrounds for students to learn knowledge. The expected results of the study include a comprehensive analysis of the textbooks published by the People’s Education Press and the Beijing Normal University Press, and suggestions on textbook compilation and teaching based on the guidance of the Mathematics Curriculum Standards for Compulsory Education (2022 Edition). Through this study, it is expected to help teachers deepen their understanding of the teaching content of “circle”, and provide a useful reference for the revision of primary school mathematics textbooks and teachers’ teaching.

Subject Areas

Pedagogy

Keywords

Primary School Mathematics, Textbook Research, Circle

1. Preface

With the progress of society and technology, subject knowledge also needs to be constantly updated. Comparing textbooks can enable teachers to timely understand the latest research results and teaching trends, and ensure that teaching content keeps up with the times. At the same time, in order to meet the diverse learning requirements of students, educators should understand the advantages and disadvantages of each textbook to better design teaching plans. They can adjust teaching methods according to students' learning needs and cognitive characteristics, and improve the effectiveness and pertinence of teaching.

Given the widespread application and importance of the content of circles in the Beijing Normal University and People's Education Press versions of textbooks, this article explores the design ideas and usage strategies of the circular content in primary school textbooks by comparing and analyzing the content of circles in the two versions. To a certain extent, it enriches and enriches the research content related to circles in primary school mathematics textbooks, and puts forward certain opinions and suggestions for supplementing and revising the textbooks, making them more readable and teachable.

2. Research Background and Significance

1) Research background

Realistic background

Mathematics is one of the oldest fields of human cognition [1], and the process of human research on circles also reflects the development of mathematics.

The content of circles occupies a cornerstone position in the field of mathematics and has important application value. Moreover, the articles in existing journals and magazines are mostly written by primary and secondary school teachers, and they are mostly based on their personal teaching practices and experiences, with little in-depth analysis and interpretation of the textbooks themselves. This tendency to some extent increases the subjective color of the articles. Therefore, it is particularly necessary and urgent to conduct a comparative analysis of textbooks related to circular content.

Social significance

Textbooks, as important tools for transmitting knowledge and assisting teaching, play a crucial role in improving the quality of education. Excellent textbooks can effectively lead educational work and provide scientific and clear guidance [2]. At the same time, textbook construction plays a very important role in improving education quality, promoting scientific and technological

progress, and cultural inheritance and innovation.

Studying the content of different versions of textbooks has multifaceted significance. For textbook writers, comparing the differences between different versions of textbooks horizontally is conducive to a deeper understanding of the logic and strategies of textbook arrangement, and promotes the revision and improvement of textbooks [3]. For educators, analyzing different versions of textbooks can help them grasp the teaching structure and content, appropriately supplement knowledge points, make up for the shortcomings of a single textbook, and better serve classroom teaching. For students, interpreting different versions of textbooks is beneficial for improving their knowledge structure and improving learning efficiency.

Policy orientation

In April 2022, the “Compulsory Education Mathematics Curriculum Standards (2022 Edition)” (hereinafter referred to as the “Curriculum Standards (2022)”) were promulgated and put into use. The newly issued curriculum standards proposed “core literacy”, and the content of circles played an important role in cultivating students’ core literacy such as geometric intuition, spatial reasoning awareness, and application awareness [4].

With the implementation of the new curriculum standards, a situation of “a hundred flowers blooming” and “a hundred schools of thought contending” has emerged where multiple versions of textbooks coexist. However, upon careful reading of a certain knowledge point in each version of the textbook, it is not difficult to find that there are actually many differences, and some even have the phenomenon of saying different things. With the continuous deepening of basic education curriculum reform, the national teaching materials have achieved a pattern of “one standard, multiple textbooks [5]”. Under a unified curriculum standard, multiple versions of textbooks are allowed to be used in parallel. There are certain differences between different versions of textbooks, and where there are differences, there is progress and innovation.

2) Research significance

Theoretical significance

Through literature review, it can be seen that currently, it is common to conduct comparative research on mathematical textbooks from the perspectives of real numbers, functions, geometric parts, triangles, etc. However, there are relatively few studies that compare and analyze the content of circles. Therefore, studying the content of “circles” in middle school mathematics textbooks published by Beijing Normal University Press and People’s Education Press can enrich the comparative research of mathematics textbooks and provide a new perspective for mathematics textbook research.

Meanwhile, the content of “circle” is an important chapter in elementary school mathematics teaching, which has certain teaching difficulties and specific teaching rules [6]. This article conducts comparative research through content analysis, quantitative comparison, and literature review. By comparing the two versions of textbooks, theoretical suggestions can be provided for the study of

mathematical teaching laws of circles, promoting the deep integration of mathematical teaching theory and practice. It helps textbook writers to more accurately grasp the teaching focus and difficulties of “circle”, providing reference for textbook revision and arrangement.

Practical significance

There are different versions of primary school mathematics textbooks, each with its own characteristics in terms of arrangement system and content presentation, while the literacy goals and knowledge system are consistent. Even though the same version of textbooks presents differences in the arrangement of different teaching contents, similar teaching contents also have more or less similarities. “Same” and “difference” make comparative analysis have practical operational value in textbook interpretation [7].

Comparative research on the content of “circles” in the two versions of textbooks can help teachers better understand the design intention and teaching objectives of the textbooks, thereby guiding teaching practice. Teachers can discover the differences in emphasis and difficulty in the content of “circles” among different textbooks based on research results, in order to choose teaching content and difficulty that are more suitable for students. This helps students better grasp the knowledge of circles, and improve their mathematical literacy and problem-solving abilities.

3. Current Status and Review of Research at Home and Abroad

1) Current Status of Comparative Research on Mathematics Textbooks

Gonales focuses on studying the content and questioning methods of questions in textbooks, and finds that the types of information contained in the questions and the types of possible answers they may trigger have a significant impact on the effectiveness of students in mastering knowledge [8]. Son studied the factors that affect the effectiveness of teachers using mathematics textbooks and analyzed that when applying mathematics textbook content to teaching practice, teachers must fully consider the thinking levels of students in mathematical activities and meet their cognitive needs. In this way, teachers can create diverse learning opportunities for students of different levels [9]. Liu Jiucheng conducted a comparative study on the curriculum standards of five countries, China, the United States, Australia, the United Kingdom, and Japan, and found that the content of Chinese textbooks in the comprehensive and practical aspects is relatively weak, and further concretization is needed to enhance their operability. There are certain difficulties in combining statistics and probability, which poses challenges for students when learning abstract probability content. In addition, Chinese textbooks lack strict normative standards for the selection of arithmetic content, and it is necessary to further clarify the dominant position of arithmetic in primary school mathematics [10]. Li Jun made a detailed comparison between the People’s Education Press and the Beijing Normal University Press primary school mathematics textbooks. He pointed out that the People’s

Education Press textbooks have a logical and rigorous content arrangement, with a focus on imparting basic knowledge. In contrast, the Beijing Normal University version of textbooks has a significant leap in content arrangement, providing more freedom for teachers and students to play. Based on these findings, Li Jun suggests that the structural design of textbooks should follow the principle of spiral ascent, minimizing unnecessary repetition to achieve systematic and concise knowledge structure [11].

2) Current Status of Comparative Research on Circle Content

Di Mai and Wang Xiaoqin compared and analyzed early Western mathematical textbooks, and found that the early textbooks were influenced by the ancient Greek mathematician Archimedes when deriving the formula for circular area. They mainly used methods such as exhaustion and analogy to pursue rigorous proof. However, although these methods are rigorous, they are difficult to understand. Therefore, after entering the 20th century, mathematics teaching began to pay more attention to the combination of numbers and shapes, rather than pure mathematical reasoning. Therefore, the limit method and equal integral deformation method based on calculus theory have gradually become the mainstream derivation methods in China's mathematics textbooks [12]. Dai Qin conducted an in-depth analysis of the teaching content on circular area in Japanese elementary school mathematics textbooks. Research has found that Japanese textbooks tend to adopt inquiry-based teaching methods in their writing, and the teaching process is gradual and more gradual compared to the teaching pace in China. In the textbook, the area range of a circle is initially determined by the relationship between the circle and the inner and outer squares, and then the area of the circle is estimated using the method of counting squares. Due to the complexity of the estimation process, the textbook proposes a method to convert the area of a circle into rectangles, parallelograms, and triangles, in order to obtain a more concise formula for the area of a circle. In addition, Japanese textbooks also showcase the contributions made by scientists from multiple countries in the study of circles, which helps to broaden students' knowledge horizons [13]. Lv Xiaoyue conducted a comparative study on the "circle" content in the mathematics textbooks of the People's Education Press and the Beijing Normal University Press, and found that the People's Education Press pays more attention to the correlation between knowledge points, the illustrations are closer to life, and there are fewer exercises. The focus is on helping students master basic knowledge. The Beijing Normal University version focuses more on exploration, with more questions and a greater emphasis on students' reasoning ability. [14]

3) Literature Review

Through the organization and analysis of the above literature, it can be seen that researchers have explored the comparison of the structure and circle-related content of the textbook. When choosing textbook versions, the main choices in China are the People's Education Press and the Beijing Normal University Press, while in foreign countries, versions from neighboring countries such as Japan

and South Korea, as well as developed countries such as the United States, are mainly chosen. When comparing textbooks, researchers mainly use a combination of qualitative and quantitative methods to compare and analyze similarities and differences in content arrangement, exercises, mathematical cultural methods, and other aspects, and draw more convincing conclusions.

At present, there is a limited amount of comparative research on “circle” textbooks, and most articles focus on “circle” teaching. This may be related to the high enthusiasm of many primary and secondary school teachers for researching “circle” teaching, but their research is mostly based on their own experience, lacking theoretical and data support, and the conclusions drawn are not universal.

Therefore, this article draws on strengths and complements weaknesses, and adopts a combination of qualitative and quantitative methods to compare and study the “circle” content in the sixth-grade mathematics textbooks of the People’s Education Press and the Beijing Normal University Press. Suggestions for improving the textbooks are proposed to help the teacher group better understand the editor’s intentions, improve the teaching level of the teacher group, and ultimately improve the quality of teaching.

4. Research Design

1) Research Object

This article takes the content of the “Circle” chapter in the sixth grade of the Mathematics Textbook for Compulsory Education published by Beijing Normal University Press (2017) and People’s Education Press (2022) as the research object.

2) Research Content

In order to comprehensively and meticulously analyze the content of the “circle” chapter in the Beijing Normal University Press and People’s Education Press textbooks, this article will explore from three dimensions: content arrangement, exercise setting, and mathematical culture.

Content Arrangement

The basic form of organizing primary school mathematics curriculum and textbook content has always been the focus of textbook research. The table compiled by Chen Xin clearly and intuitively shows the development trend of the arrangement mode of primary school mathematics textbooks in China in the past century, which highlights the increasing emphasis on spiral upward trend in the compilation of primary school mathematics textbooks since 1950 [15].

Research on content arrangement can better organize the chapter setting, distribution, quantity, and logical relationship of knowledge points in textbooks, and clarify the process of knowledge generation and development [16]. By analyzing the structure of textbooks, we can understand the characteristics of textbook arrangement and teaching requirements, providing reference and basis for teachers’ teaching.

Exercise Setting

With the continuous promotion of the new curriculum reform and the proposal of the goal of cultivating core competencies, there have been many changes in the example exercises in primary school mathematics textbooks, which have shown the characteristics of diversified question type design, life-oriented content design, and goal-oriented literacy design [17]. So, starting from these three characteristics to study the setting of exercises can help teachers adjust the learning level they hope students to achieve reasonably, and on the other hand, it can help teachers improve the scientific and targeted nature of the questions, better meeting the learning needs of students. By analyzing the content arrangement and exercises, it can also help teachers evaluate the overall difficulty of textbooks in the context of the new curriculum reform.

Mathematical Culture

Mathematical culture usually refers to the mathematical history, beauty, and activities, contributions, and significance of mathematics in human life, technology, and social development, as demonstrated in the formation and development of mathematical ideas, spirits, methods, viewpoints, and language [18]. Based on the research of Wang Jianpan, Wang Xiaoqin, and Hong Yanjun, this article roughly divides the content of mathematical culture presented in textbooks into four categories: mathematical history, mathematics and life, mathematics and science, and mathematics and art [19].

Mathematical culture is an inherent humanistic heritage that plays a role in enriching students' learning knowledge, innovating methods in the application process, and improving their rational decision-making and judgment abilities [20]. Therefore, integrating mathematical cultural education into the process of mathematics teaching can help students quickly find the laws of things, better discover the geometric beauty in life, and better choose favorable decisions, thereby enhancing their understanding and perception of the world and life.

4) Research Methods

Literature Research Method

In the research process, combined with the research objectives, relevant academic research materials were widely collected and consulted through channels and databases such as the school library, Foreign Language Resource Network, China National Knowledge Infrastructure (CNKI), Chaoxing Journal, VIP Chinese Journal, Wanfang Data Resources, Google Scholar, etc., to understand the current status and development trends of the research, determine the research dimensions, establish a research framework, and use this as a theoretical basis for further investigation and analysis.

Text Analysis Method

This study adopts a combination of qualitative and quantitative methods to compare the content of "circles" in the two versions of textbooks from three aspects: textbook content arrangement, exercise questions, and mathematical culture. Firstly, conduct data statistics to form a table, then conduct preliminary quantitative analysis and interpretation of the data. Finally, combine relevant li-

terature for qualitative analysis to analyze their commonalities, individuality, and reference significance.

Comparative Analysis Method

This study selected textbooks from People's Education Press and Beijing Normal University Press, and used comparative analysis to compare the content arrangement, exercise questions, and mathematical culture of the two versions of "Circle". Based on the comparison results, similarities and differences were summarized, and the research conclusion was finally drawn.

5) Basic Framework

The flowchart describes a research process, including literature review, literature review, asking questions, collecting data, sorting out problems, organizing and analyzing data in combination with teaching materials, comparative research, and putting forward suggestions for improvement. Among them, the focus is on the comparative study of the content of "circle" in the two versions of the textbook, and based on this, the opinions on the compilation and teaching of the textbook are put forward (See **Figure 1**).

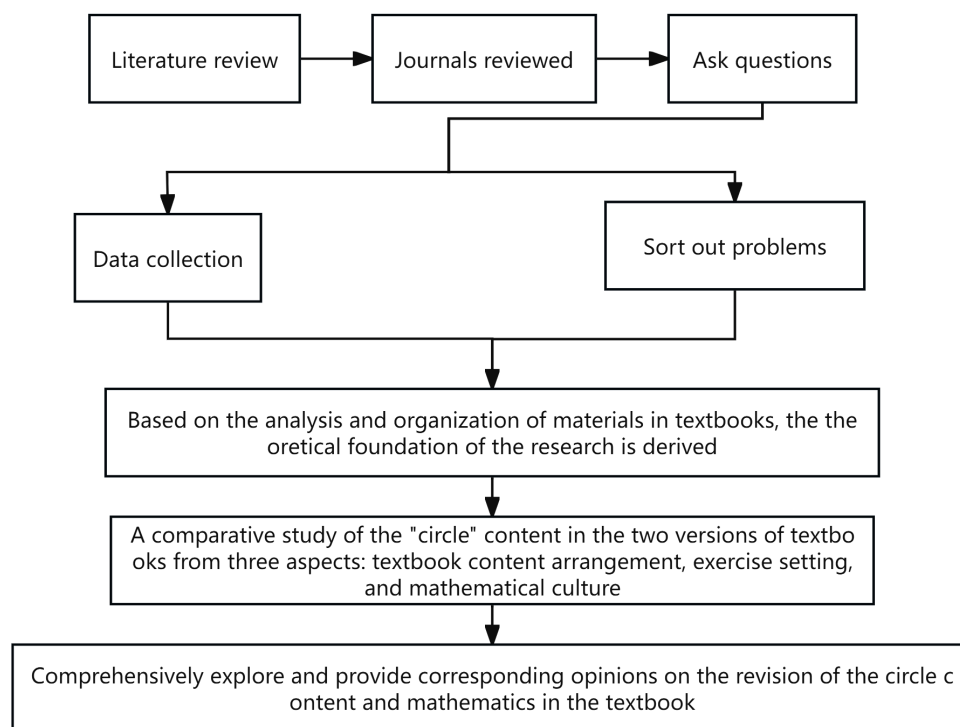


Figure 1. Research idea flow chart.

5. Research Results

1) Comparison of Content Layout

Block Arrangement

The design of the section reflects the form and method in which the author unfolds the teaching content. This study presents the layout of the sections of the two versions of textbooks through a statistical table (See "**Table 1**").

Table 1. Block arrangement carding table.

Beijing Normal University Edition	People's Education Edition
Situation diagram and questioning	Situation diagram and questioning
Exploration process	Exploration process
Give it a try	Give it a try
Practice	Practice
Do you know it?	Do you know it?
	Mathematics in life

Similarities

Point 1: Consistency in the number, type, and function of sectors

The content of each lesson in both versions of the textbook includes four sections: situational diagrams and questioning, exploration process, practice and mathematical life. The situational diagram provides specific situational materials for students to learn knowledge, the exploration process provides methods and paths for students to think, and exercise questions help students consolidate their knowledge.

Point 2: The positions where the topic appears are the same

Both versions of the textbook place the topic above the situational diagram, and both versions focus on highlighting the topic by placing it in a prominent position.

Differences

The first point is that the two versions of textbooks have different ways of infiltrating mathematics and life.

The People's Education Press directly presents the close connection between mathematical knowledge and life through the specialized section "Mathematics in Life". Although the Beijing Normal University edition does not have a dedicated section to introduce exercises in mathematics and daily life, it can be seen from the textbook that the exploration process presented throughout it already presents a connection with daily life.

Point 2: Different ways of annotating questions

The questions mentioned in the People's Education Press textbooks are not specially labeled, and some of them are interspersed in dialogues, presented in the form of dialogue boxes. Generally, questions with thinking difficulties appear in dialogues. However, all questions in the Beijing Normal University version will have a green dot before them, and there is no distinction between questions of different difficulty levels. By comparison, it can be seen that the way Beijing Normal University annotates questions is more intuitive and clear, while the People's Education Press distinguishes based on the difficulty of the questions, indicating that both versions of the textbook have their own characteristics in this section.

2) List order of Textbook Content

To understand the logical relationship between the knowledge points in the textbook and the richness of the knowledge points, we must clarify the order in which the textbook content is listed (See “Table 2”).

Table 2. Sorting table of textbook content sequence.

	Beijing Normal University Editio	People’s Education Edition
Understanding Circles	Lesson 1	Draw a circle Concept: center, radius, and diameter The characteristics and connections of radius and diameter How to utilize radius and center of circle
	Lesson 2	A circle is an axisymmetric figure Characteristics of the symmetry axis of a circle Design the shape of a circle
		Find the center of the circle Design Circle
		The concept of circumference
		The relationship between circumference and diameter
		π $C = \pi d = 2\pi r$
Circumference	Lesson 1	$S = \pi r^2$ Fan-shaped concept
	Lesson 2	When there is a large circle in a square, calculate the area between the square and the circle
		When there is the largest square in a circle, find the area between the square and the circle
The area of a circle		Fan-shaped concept
		Center angle
Sector		Determine the starting position on the curve

Similarities:

Both versions of the textbook present three parts in sequence: “Understanding of Circles,” “Perimeter of Circles,” and “Area of Circles.” They first introduce basic concepts, then explore the relationship between concepts, and finally apply concepts. This is in line with students’ cognitive concerns, and through the table, we can find that each part of the content has certain similarities.

Differences:

The richness of knowledge about circles varies. It can be visually seen from the table that the content of the People’s Education Press is more diverse. The People’s Education Press has added “fan-shaped” and “circular” system content

compared to the Beijing Normal University Press. Compared with the Beijing Normal University edition, the People's Education Press emphasizes broadening students' horizons through textbooks. At the same time, the People's Education Press focuses more on guiding students to feel the connection between mathematics and life, such as setting up the section of "determining the starting position on the curve".

2) Exercise Setting

Exercises focus on key knowledge points

Each topic in the textbook has its own unique role, and this study mainly conducted a statistical analysis of the knowledge points and their quantity examined (See "Table 3").

Table 3. Table of exercise quantity sorting.

	Beijing Normal University Edition	People's Education Edition
Understanding Circles	13	10
Circumference	9	11
The area of a circle	9	16
Total	31	37

Exercise Types

In order to present the exercise types of the two versions of textbooks more intuitively, this article has conducted a statistical analysis of the exercise types of the two versions of textbooks (See "Table 4").

Table 4. Table of exercise types.

	Beijing Normal University Edition	People's Education Edition
Drawing questions	7	5
Completion	0	2
True or False	7	5
Answering questions	11	10
Application questions	10	20

Analysis

① Similarities

Point 1: The exercise set has gradients and levels

The two versions of textbooks not only provide exercises to consolidate the foundation of the same knowledge point, but also include exercises that can enhance students' skills in applying knowledge comprehensively.

Point 2: Using exercises to introduce knowledge points

The People's Education Press has set the knowledge point of the axis of symmetry of a circle as an exercise, and through students' hands-on operation, we can understand the characteristics of the axis of symmetry of a circle. Similarly, the Beijing Normal University version will include the knowledge points of cal-

culating the area of circular and other combination shapes in the exercise questions.

Third point: Pay attention to the setting of answer questions and application questions

Both versions of the textbook emphasize the setting of answer questions and application questions, which require comparing the calculated results with the actual situation, which is conducive to providing more specific feedback on students' mastery of the knowledge points.

② Difference

The two versions of textbooks have different emphases on setting exercises. The Beijing Normal University version of the textbook focuses more on practicing basic knowledge. There are 31 exercises in the textbook, including 13 exercises in the "Understanding Circles" section, accounting for 42% of the total exercises. The People's Education Press places more emphasis on practicing the knowledge of "the area of a circle", accounting for 43% of the total number of exercises.

3) Distribution of Mathematical Cultural Content

In order to clearly present the types and quantities of various mathematical cultural content in the first chapter of the two versions of the textbook, the author has developed the following statistical table based on the actual content of the textbook (See "Table 5").

Table 5. Mathematical culture sorting table.

	Beijing Normal University Edition	People's Education Edition
Math and Art	7	5
Math and Scientific	0	2
Mathematics History	7	5
Answering questions	11	10
Mathe and Life	10	20

Similarities

Both versions of textbooks highlight the connection between mathematics and life. According to the table above, it can be seen that each edition of the textbook has the highest number of mathematical cultural content related to "Mathematics and Life". This reflects the strong atmosphere of life in the two versions of the textbook, and its editors hope that students can fully understand the widespread application of mathematics in life and feel the significance of mathematics in life during the process of learning mathematics.

Differences

The mathematical culture of the two versions of textbooks differs in mathematics and science. The Beijing Normal University version uses science popularization in the textbook to enable students to understand the principles behind natural phenomena even with limited learning experience related to circles,

while the People's Education version presents a blank space in practicing science and mathematics.

6. Provide Suggestions

Enhance the thinking content of mathematical culture in textbooks

Mathematics and culture are intertwined. Deeply studying the infiltration path of mathematical culture can help broaden educational horizons, promote interdisciplinary integration, enhance the diversity of primary school mathematics teaching, cultivate students' mathematical cultural literacy, and make them creative and innovative talents. By deeply understanding the cultural connotations of mathematics, students can better understand the application and value of mathematics, develop a strong interest in learning mathematics, and lay a foundation for future academic advancement [21].

Textbooks can increase the number of open-ended questions

Traditional teachers place more emphasis on cultivating and improving the logical, rigorous, and meticulous thinking of students through mathematical learning, while neglecting the cultivation and improvement of the comprehensive divergent and innovative thinking of students.

In fact, the process of learning mathematics is not only a process for students to acquire mathematical knowledge, but also a process of gradually deepening their understanding and recognition of the knowledge they have learned. It is a process of proficiently and flexibly applying the knowledge they have learned, as well as a process of gradually expanding their thinking training through knowledge carriers. [22] Teachers should provide students with a platform for independent thinking, exploration, and innovation, allowing them to make bold assumptions, freely verify, and draw conclusions.

Textbooks should guide students to master the methods of review

In order to better achieve this goal, textbooks can supplement the methods of organizing knowledge points such as mind maps in the section of organization and review. In primary school mathematics courses, students usually need to master various mathematical concepts, theorems, and methods. Mind maps can help them better organize and summarize the knowledge they have learned, and improve learning efficiency and memory effectiveness. At the same time, mind maps can serve as a review tool to help students review and consolidate knowledge points after class.

7. Innovation

This study not only fills the research gap to a certain extent through in-depth comparative analysis between the People's Education Press and the Beijing Normal University Press, but also conducts sufficient exploration and analysis on the specific content of "circle", and deeply explores the advantages, disadvantages, and usage scenarios of the two versions of textbooks.

At the same time, this article is not based on the personal teaching practice

and experience of teachers to conduct research, but on a deep level analysis and interpretation of the textbook itself, which to some extent increases the objectivity of the research. This provides a meaningful perspective and inspiration for improving and implementing textbooks in China.

8. Research Shortcomings

Considering my limited abilities and experience, there are still the following issues that need further research and improvement in the compilation of textbooks related to circles:

1) Overreliance on text analysis

Some comparative studies of textbooks may mainly rely on the interpretation and analysis of textbook texts, while neglecting the examination of teaching practices, teacher feedback, and student usage effects.

Lack of quantitative data support: Research may rely more on qualitative analysis and lack quantitative data to support the reliability of conclusions.

2) Insufficient analytical dimensions

1. Lack of in-depth content analysis

The analysis of textbook content, knowledge coverage, theory and application may not be in-depth enough to fully reveal the differences and advantages between textbooks.

2. Neglecting layout design and visual effects

The analysis of the layout design, chart quality, visual effects, and other aspects of the textbook may not be given enough attention, which affects the evaluation of the overall quality of the textbook.

3) Lack of feedback on teaching practice

Failure to consider the effectiveness of student use: The study may not have taken into account the actual effectiveness and acceptance of student use, resulting in incomplete evaluation of the textbook.

4) Limitations of research conclusions

1. The conclusion is too absolute

Some studies may overemphasize the advantages or disadvantages of a certain version of the textbook, while ignoring the influence of other factors.

2. Lack of foresight

The research may not have fully considered the impact of future educational trends and technological developments on textbooks, resulting in limited timeliness of conclusions.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Li, W. (2011) Introduction to Mathematical History. 3rd Edition. Higher Education Press, 2.

- [2] Lu, X. (2024) Exploration of Excellent Textbook Publishing Based on the Cultivation of New Quality Talents. *Science and Technology Publishing*, No. 5, 59-67. <https://doi.org/10.16510/j.cnki.kjycb.20240527.003>
- [3] Ren, X. (2023) Practical Improvement of Interpretation of Primary School Mathematics Textbooks from the Perspective of Comparative Analysis. *Primary School Teaching Reference*, No. 32, 75-77.
- [4] Ministry of Education of the People's Republic of China (2022) Mathematics Curriculum Standards for Compulsory Education. Beijing Normal University Press.
- [5] Ding, H., Zhou, X., Zhou, X., *et al.* (2019) "One Standard for Multiple Textbooks" Does Not Mean "Each Version of the Textbook Has Its Own Words". *Reference for Middle School Physics Teaching*, **48**, 31-36.
- [6] Wu, Y. (2024) Research on the Teaching of Mathematical Concepts in Primary Schools from the Perspective of Core Literacy: Taking "Understanding Circles" as an Example. *Science Enthusiasts*, No. 1, 175-177.
- [7] Liang, L. and Fu, Y. (2024) Analysis of the Arrangement of Estimated Content in Primary School Mathematics Textbooks. *Primary School Teaching (Mathematics Edition)*, No. 4, 21-24.
- [8] Gonales, N.A. (1996) Problem formulation: Insights from Student Generated Question. *School Science and Mathematics*, **96**, 152-157. <https://doi.org/10.1111/j.1949-8594.1996.tb15830.x>
- [9] Son, J.W. (2008) Elementary Teachers' Mathematics Textbook Use in Terms of Cognitive Demands and Influential Factors: A Mixed Method Study. Unpublished Doctoral Dissertation. Michigan State University.
- [10] Liu, J. (2016) Comparison and Inspiration of Primary School Mathematics Curriculum Content in Five Countries: Based on the Current Primary School Mathematics Curriculum Standards in China, the United States, Australia, the United Kingdom, and Japan. *Foreign Primary and Secondary Education*, No.10, 58-64.
- [11] Li, J. (2006) Comparative Study of Primary School Mathematics Textbooks between People's Education Press and Beijing Normal University Press. Central China Normal University.
- [12] Di, M. and Wang, X. (2022) Formula for Circle Area in Early Western Geometry Textbooks. *Mathematical Bulletin*, **61**, 7-11.
- [13] Dai, Q. (2017) The Arrangement and Inspiration of "Circle Area" in Japanese Textbooks: An Introduction to Japanese Elementary School Mathematics Textbooks. *Primary School Teaching*, No. 1, 22-25.
- [14] Lv, X. (2021) Comparative Study on the Content of Circle in Middle School Mathematics Textbooks of People's Education Press and Beijing Normal University Press. Southwest University.
- [15] Yang, X., Zhang, C. and Wang, Y. (2023) A Study on the Consistency of Spiral Arrangement and Learning Advancement in Mathematics Textbooks: Taking the "View" Content of the People's Education Press as an Example. *Journal of Mathematics Education*, **32**, 12-17.
- [16] Yan, C. (2023) Structured Reading Strategies for Primary School Mathematics Textbooks. *Teaching and Management*, No. 35, 68-71.
- [17] Ding, Z. (2024) Research on Creative Application Strategies of Examples and Exercises in Primary School Mathematics Textbooks under Core Literacy. *Huaxia Teachers*, No. 5, 91-93. <https://doi.org/10.16704/j.cnki.hxjs.2024.05.028>
- [18] Zhang, D., Shen, H. and Pei, Y. (2023) Mathematical Culture: From Textbooks to

-
- Teaching—Taking the “Circle” Chapter in the Three Editions of Textbooks as an Example. *Training for Primary and Secondary School Teachers*, No. 9, 42-47.
- [19] Wang, J., Wang, X. and Hong, Y. (2015) A Comparative Study of Mathematical Culture in High School Mathematics Textbooks in China, France, and the United States. *Education Development Research*, No. 20, 97.
- [20] Lin, Y. (2024) The Dilemma and Breakthrough Suggestions of Primary School Mathematics Culture Infiltration. *Tianjin Education*, No. 15, 10-12.
- [21] Bai, L. (2024) Practical Research on Integrating Mathematical Culture Education into Primary School Mathematics. *Huaxia Teachers*, No. 1, 96-98.
<https://doi.org/10.16704/j.cnki.hxjs.2024.01.005>
- [22] Zhang, F. (2019) Using Open Questions to Train Students’ Mathematical Thinking. *Jilin Education*, No. Z4, 135.