



A Study on Reading Practice Systems in Primary School Chinese Textbooks-Based on Descriptive Statistical Analysis

Ziwei Tang and Zhen Kong^(✉)

School of Teacher Education, Nanjing Xiaozhuang College, Nanjing, China
772505944@qq.com

Abstract. Based on Bloom's new classification of cognitive dimensional goals, this article constructs a research framework for the reading exercise system in unified primary Chinese textbooks, and uses descriptive statistical analysis to explore the distribution characteristics and differences in the distribution of the reading exercise system in unified primary language textbooks for grades 3–6. The study found that the reading practice questions in the middle and upper grades were unevenly distributed across the six cognitive dimensions, with the understanding dimension having the highest number of exercises, and the evaluation dimension having the lowest number of exercises. There were differences in the distribution of cognitive dimensions of the exercises in the middle and senior years, with the middle years' post-lesson exercise sets being distributed on the three basic cognitive dimensions of remembering, understanding and application, and the senior years' post-lesson exercises being distributed mainly on the four cognitive dimensions of understanding, analysis, remembering and creation, with analysis and creation being the higher-level cognitive dimensions.

Keywords: Primary Chinese textbooks · Bloom's new classification of cognitive goals · Reading practice systems · Descriptive statistics

1 Introduction

The textbook practice system, also known as the homework system, is a system of content for various kinds of thinking and training designed in an organized, planned and targeted manner according to the teaching objectives of the curriculum. (Zhang & Xu, 2007) The practice system is one of the four systems of Chinese textbooks, and is a vehicle for students to master knowledge, transfer knowledge and train their abilities. The textbook practice system not only helps teachers to grasp the important and difficult points of teaching, optimize teaching methods, carry out teaching scientifically and improve the efficiency of classroom teaching; it also helps students to achieve knowledge-energy transformation and improve language literacy. Therefore, it is of great practical significance to study textbook practice systems. At present, textbook practice systems are mostly studied based on text analysis methods (Mu et al., 2019) or comparative

analysis methods (Shi, 2020; Zhang, 2020; Zhang, 2018), but there is a lack of systematic quantitative research.

Bloom and others proposed a system of classifying educational objectives in their 1956 book “Taxonomy of Educational Objectives, A Handbook of Classification of Educational Objectives Cognitive Domains”. 2001 saw the publication of Anderson and others revised “Taxonomy of Learning, Teaching and Assessment – Bloom’s Taxonomy of Educational Objectives”, referred to as “Bloom’s New Taxonomy of Cognitive Goals”. Since its introduction, Bloom’s New Taxonomy of Cognitive Objectives has attracted widespread attention and application from educators in China. For example, based on the framework of Bloom’s New Classification of Cognitive Dimensions, Zhang uses the research methods of comparative analysis and text analysis to analyze the homework system of the primary school Chinese textbooks of the Renminbi edition, pointing out that the exercise system should focus on the improvement of students’ comprehensive ability and literacy (Zhang, 2016). However, few scholars have used Bloom’s new classification of cognitive goals to study the Unified Edition primary language textbook exercise system.

To sum up, this study investigates the reading post-course practice system of the Unified Edition primary Chinese textbooks from a macro-quantitative perspective based on the perspective of Bloom’s new classification of cognitive goals. It is intended to help frontline teachers to better understand and apply the practice system.

2 Study Design

2.1 Subject of Study

This article takes the reading post-lesson exercises of the Unified Edition primary Chinese textbooks for grades 3–6 (middle and upper years) as the object of study. Among the practice systems in the 12 Chinese textbooks, the practice system in the lower years focuses on basic skills training such as literacy and writing, while the practice system in the middle and upper years is rich in questions and focuses on the development of multilingualism, which is more in line with the requirements of the study. Therefore, this study focuses on the reading practice system for the middle and upper years. The eight textbooks contain a total of 203 texts, of which 118 are intensive reading texts and 85 are skimming texts. Because of the special nature of the skimmed texts, there are no exercises at the end of the lessons, so they are not included in the scope of the study. This article focuses on the post-lesson exercises for 118 intensive reading texts in Grades 3–6.

2.2 Research Framework

2.2.1 Research Framework Construction

The cognitive dimensions in Bloom’s new classification of cognitive goals are divided into six cognitive dimensions: remember, understand, apply, analyze, evaluate, and create, and nineteen subcategories of cognitive dimensions. This classification forms the foundational framework for the study of reading practice systems in this thesis.

Table 1. Table of reliability tests for the research framework

Reliability test name	Numerical values	Valid observation values
Inter-categorizer reliability	0.796	236
Intra-classifier reliability	0.894	236

On this basis, this study constructs specific classification criteria for the research framework through an expert survey method. A panel of 10 experts from different schools was selected for the study. Firstly, the researcher selected the terms based on the textbook, the panel members rated and commented on the terms, the researcher revised the terms based on the feedback from the panel, and again the panel members rated and commented. Eventually, specific classification criteria for the research framework were constructed based on the analysis of the scoring results by the expert panel members, resulting in the final research framework.

2.2.2 Reliability Test of the Research Framework

This paper uses the Kappa statistic metric to assess the reliability of the exercise system classification criteria. The specific formula is $K = (Po - Pe)/(1 - Pe)$.

The reliability tests were as follows: (1) Inter-categorizer reliability. The researcher invited two individuals to categorize the post-lesson exercises according to the analytical framework described above. Both personnel were academics in education and had some knowledge of the new classification framework for Bloom's cognitive dimensions objectives. (2) Intra-categorizer reliability. The researcher invited two persons to classify the same reading post-lesson exercise twice according to the research framework, and these two classifications were conducted five days apart. A total of 236 exercises were involved in the two reliability tests. After analyzing the statistics, the results are as shown in Table 1.

As can be seen from the Table 1, the inter-categorizer reliability is 0.796, which is in the standard range of 0.60–0.80, indicating a high level of inter-categorizer reliability. The intra-categorizer reliability is 0.894, which is in the standard range of 0.81–1, indicating that the intra-categorizer reliability is generally consistent. This suggests that the constructed research framework is credible.

2.3 Research Methodology

This study uses descriptive statistical analysis. Descriptive statistical analysis is a common method used in data analysis to describe the underlying situation of the data. This article uses descriptive statistical analysis to analyse the distribution characteristics and differences in the distribution of post-lesson exercises in the unified version of primary Chinese textbooks for the middle and upper grades.

Table 2. Analysis of exercises in the middle years

Cognitive dimensions	Remember	Understand	Apply	Analyze	Evaluate	Create
Year 3 Up	10	33	11	5	0	6
	15.38%	50.77%	16.92%	7.69%	0	9.23%
Year 3 Lower	14	30	16	5	1	6
	19.44%	41.67%	22.22%	6.94%	1.39%	8.33%
Year 4 Up	10	27	10	14	1	10
	13.89%	37.5%	13.89%	19.44%	1.39%	13.89%
Year 4 Lower	6	34	8	7	0	10
	9.23%	52.3%	12.3%	10.8%	0	15.4%
Total	40	124	45	31	2	32
	14.60%	45.26%	16.42%	11.31%	0.73%	11.68%

3 Analysis of Results

Based on the research framework constructed, the post-lesson exercises in the textbooks for the middle and senior years were classified, counted and the calculations were plotted in Table 2.

3.1 Statistical Analysis of Exercises in the Middle Years

Overall, there were 274 exercises in the middle years section. The understanding dimension had the highest number of exercises in the middle years section, with 124 (45.26%); followed by the application dimension, with 45 (16.42%); and the evaluation dimension had the lowest number of exercises, with only 2 (0.73%). This shows that the post-lesson exercises in the middle years are mainly focused on understanding, application and remembering, and that these three dimensions are less difficult and do not require a high level of thinking logic.

Specifically, in Year 3 there were 137 questions, with the three foundational dimensions of understanding, application and remembering accounting for the largest number of exercises; in Year 4 the total number of exercises was the same as in Year 3, with the two dimensions of understanding and analysis accounting for the largest number of exercises in the first book of Year 4; and in the second book of Year 4, the understanding, creation and application dimensions accounted for the largest number of exercises. As can be seen, the exercises in Year 3 focus on the basic cognitive dimension and in Year 4 the exercises begin to move towards the two higher level cognitive dimensions of analysis and creation.

Table 3. Analysis of exercises in the upper grades

Cognitive dimensions	Remember	Understand	Apply	Analyze	Evaluate	Create
Year 5 Up	8	34	7	13	1	10
	11.00%	46.60%	9.60%	17.8%	1.4%	13.7%
Year 5 Lower	11	25	6	9	0	5
	19.60%	44.60%	10.70%	16.1%	0	8.9%
Year 6 Up	11	22	11	15	0	10
	15.9%	31.9%	15.9%	21.7%	0	14.5%
Year 6 Lower	5	18	6	12	0	10
	9.8%	35.3%	11.8%	23.5%	0	19.6%
Total	35	99	30	49	1	35
	14.06%	39.76%	12.05%	19.68%	0.40%	14.06%

3.2 Statistical Analysis of Exercises in the Senior Years

Overall, there were 249 questions in the senior section. In the senior section, the understanding dimension had the highest number of exercises, with 99 questions (39.76%), followed by the analysis dimension, with 49 questions (19.68%). The evaluation dimension had the lowest number of exercises, with only 1 question (0.40%). It can be seen that the post-lesson exercises in the upper years are mainly focused on the understanding and analysis dimensions, with the exercises progressively focusing on the development of higher-level cognitive dimensions, while still focusing on the learning and consolidation of lower-level cognitive dimensions.

Specifically, in Year 5, there were 129 exercises, with the largest proportion of exercises in the understanding and analysis dimensions in the first book of Year 5; in the second book of Year 5, the largest proportion of exercises were in the understanding and remembering dimensions; and in Year 6, there were 120 exercises, with the largest proportion of exercises in the understanding and analysis dimensions. It can be seen that in both Year 5 and Year 6 the emphasis is on the development of students' understanding skills, while in Year 6 the focus is more on the analytical dimension, i.e. the higher level cognitive dimension (Table 3).

3.3 Differences in the Distribution of Cognitive Dimensions of Practice Questions in the Middle and Upper Grades

The understanding dimension exercises had the highest number of questions and the evaluation dimension exercises had the lowest number of questions, with only three questions. This indicates that the exercises in both the middle and senior years emphasise the development of understanding skills and lack the development of students' evaluation skills. In addition, the total number of exercises in the middle years section was higher than that in the upper years section for the three dimensions of remembering,

understanding and application, and higher than that in the upper years section for the dimensions of analysis and creation, indicating that the exercise system in the upper years section focused more on the development of higher-level cognitive dimensions and that the difficulty of the exercise system increased overall.

4 Discussion

4.1 The Systematic Arrangement of Reading Exercises in the Unified Textbooks Follows the Sequential Nature of Students' Thinking Development

Bloom's new classification of cognitive goals classifies the three dimensions of remembering, understanding and application as lower-level foundational cognitive dimensions, and analysis, evaluation and creation as higher-level cognitive dimensions, with the six cognitive dimensions progressively developing from low to high and from shallow to deep.

The three foundational cognitive dimensions of remembering, understanding and application account for a relatively large proportion of the reading post-lesson exercises in the middle years. The reading practice system in the middle years focuses on the understanding of the content of the text and the exercises mostly involve grasping the main content and expression of the text. The design of the exercises in this section is related to the lack of maturity of the logical thinking of the students in the middle years. The middle years are a transitional stage in the development of concrete figurative thinking to abstract logical thinking.

The three cognitive dimensions of understanding, analysis and application account for a greater proportion of the post-lesson exercises in the upper years of reading. This indicates that the system of reading exercises in the upper years is gradually inclined towards in-depth analysis of the content of the text and focuses on the development of students' abstract logical thinking.

The development of students' thinking does not happen overnight, but gradually. The distribution of the upper and middle school exercise system on the new classification of Bloom's six cognitive dimensions illustrates that the Unified Edition primary language reading exercise system respects the sequential nature of students' thinking development and gradually promotes students' cognitive level from low to high and from shallow to deep.

4.2 The Reading Practice System of the Unified Textbook Places Emphasis on the Development of Students' Understanding Skills

In the upper and middle grades, the most numerous exercises are those on the understanding dimension, which are far more numerous than those on the other cognitive dimensions. This shows that the reading exercise system in the TCLP textbooks places emphasis on the training and development of students' understanding thinking.

There are two main reasons why the understanding dimension accounts for the largest number of exercises: on the one hand, the understanding dimension has seven subcategories in Bloom's new classification of cognitive goals, which are rich in content.

The understanding dimension is a foundational cognitive dimension and is the basis for the development of cognitive levels to higher dimensions. On the other hand, the language thinking skills of primary school students are based on the development of language teaching, the most basic of which is reading understanding. The emphasis on the development of primary school students' understanding skills is conducive to the logical development of students' thinking to higher dimensions. This is an important reason why the understanding dimension is a large part of the overall textbook reading practice system.

4.3 The System of Reading Exercises in the Unified Textbook Ignores the Development of Students' Assessment Skills

There are only three exercises in the evaluation dimension in the middle and upper years, which is much less than the total number of exercises in the other cognitive dimensions. The evaluative dimension is a higher level cognitive dimension with a higher level of difficulty in thinking. The development of evaluative thinking helps primary school students to be able to see and evaluate things from different perspectives and to form correct perceptions. However, the small number of exercises on the evaluative dimension in the practice system neglects the development of students' evaluative skills, which is not conducive to either the development of evaluative thinking or the advancement of students towards creative thinking.

5 Conclusions and Recommendations

5.1 Conclusion

(1) The exercises in the intermediate textbooks focus on basic cognitive dimensions such as understanding and application, while the exercises in the upper textbooks focus on understanding and analysis, tilting towards higher-level cognitive dimensions. It can be seen that the system of reading exercises in the unified textbooks follows the sequential nature of students' thinking development; (2) The high number and proportion of understanding dimension exercises in the practice system of the middle and upper grades indicate that the reading practice system of the unified textbook attaches importance to the development of students' understanding skills. (3) The number of exercises on the evaluation dimension in the practice system for the middle and upper grades is only three, indicating that the reading practice system of the unified textbook ignores the development of students' evaluation skills.

Acknowledgments. The research is supported by the University Philosophy and Social Science Research Project of Jiangsu Province (2018SJA0433).

References

- Mu Jun, Shi Fangyan, Zhou Xuejing. A multidimensional analysis of the reading practice system of the unified primary language textbook[J]. *Language Construction*,2019(06):55–57,75.
- Shi Fang Yan. Research on the reading practice system of the unified textbook of primary school language [D]. Kashgar University, 2020.
- Zhang C.Y., Xu L.C. A new edition of language curriculum and pedagogy [M]. Jiangsu Education Publishing House, 2007:84.
- Zhang Yuanhang. Research on the design of the reading section assignment system of the second level language based on PIRLS reading literacy[D]. Southwest University, 2020.
- Zhang Wenqing. A comparative study on the reading practice system of Chinese and American primary school language textbooks based on the PIRLS2016 framework [D]. Shanghai Normal University,2018.
- Zhang Zi. A study of primary school language textbook assignment system based on Bloom's cognitive process dimension [D]. Huazhong Normal University,2016.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

