A Study on the Consistency between Textbook Exercises in PEP 2019 High School English Textbooks and Curriculum Standards Based on SEC Consistency Analysis Model

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Abstract: This paper uses the SEC consistency analysis model to analyze the consistency level of Reading and Thinking exercises in the 2019 high school English textbook and Curriculum Standards from dimensions of content theme and cognitive level. The results show that there is no statistically significant consistency between them. In terms of cognitive level, the Curriculum Standards pay more attention to "perceiving and identifying", while textbook exercises tend to cultivate students' "locating and extracting" ability. In the content theme dimension, the proportion of the two in each dimension is basically the same, presenting the proportional order of content > structure > language. Therefore, some suggestions are put forward for Curriculum Standards, textbook compilation and teacher reading teaching.

Keywords: Textbook Exercises, Curriculum Standards, Consistency, SEC Consistency Analysis Mode

1. Introduction

English Curriculum Standards for Senior High Schools (2017 Edition, 2020 Revision) (hereinafter referred to as Curriculum Standards) [1] is a guiding document for English teaching in senior high schools in China. The compilation of English textbooks should be based on the Curriculum Standards, and the curriculum concepts and objectives advocated by the Curriculum Standards should be fully implemented. As an important part of the textbook, exercises directly affect the cultivation of students' core literacy [2]. Therefore, it is necessary to analyze the consistency between textbook exercises and Curriculum Standards.

The foreign research on consistency has a history of more than 20 years. The main models include the Weber consistency analysis model proposed by Norman L. Weiss, the consistency SEC model developed by Andrew Porter and John Smithson based on Weber model, and the achievement analysis model of Robert Rothman and Slater. SEC model is the refinement and sublimation of Weber model. Therefore, this paper will use SEC analysis model as a consistency analysis tool to measure the consistency level of textbook exercises and Curriculum Standards to feed the compilation of textbooks, improve the quality of textbook exercises, and give full play to the maximum benefit of textbook exercises.

2. Research Design

2.1. Research Objects

In this study, exercises in reading textbooks for the optional compulsory stage of senior high school English in the PEP (2019) and Curriculum Standards for Senior High School English (2017 edition, 2020 revision) were selected as the research objects. Among them, the textbook exercises are selected as the corresponding exercises in the Reading and Thinking parts of each unit.

2.2. Research Tool

The research tool used in this study is the consistency analysis model, SEC (Surveys of Enacted

Curriculum), developed by American scholars Andrew Porter and John Smithson in the early twentieth century based on Weber's model. This model can not only construct a two-dimensional matrix of content themes and cognitive levels, but also establish the surveys of enacted curriculum. The consistency coefficient of coding is used to quantitatively analyze the matching degree and consistency of each dimension, and the key distribution surface and contrast bar chart can be drawn according to the coding statistical table to intuitively get the consistency of exercises and Curriculum Standards. The analysis process is as follows:

(1) Coding and statistics of Curriculum Standards and exercises in high school English textbooks under the framework of the two-dimensional matrix of "content theme × cognitive level".

(2) Normalized the data of the two-dimensional matrix to obtain the ratio value, and then substituted the ratio value into the Porter consistency coefficient formula to obtain the consistency degree of the two. The Porter consistency coefficient formula is as follows:

$$P = 1 - \frac{\sum_{i=1}^{n} \mid X_i - Y_i \mid}{2}$$

Where "n" represents the total number of cells, "i" represents any cell (1≤i≤n), "Ki" and "Ji" represent the corresponding cell ratio values in the two matrices of Curriculum Standards and textbooks, respectively. Consistency coefficient "P" is proportional to consistency (0≤P≤1), P = 0 means completely inconsistent, P = 1 means completely consistent [3].

2.3. Research Procedures

2.3.1. Construction of SEC Consistency Analysis Mode

As for the division of the consistent two-dimensional matrix of "content theme × cognitive level", this study is based on Guo Baoxian and Zhang Jianzhong's foreign language reading structure framework system. On the one hand, in terms of content theme dimension, the content themes are divided into "language", "content" and "structure" [3]. Basis on this, the language level is subdivided into vocabulary, syntax, rhetoric and language features. The content is divided into fact, detail, opinion, main idea, intention, emotion and attitude. And the structure can be divided into macro-structure and micro-structure [4]. On the other hand, in terms of cognitive level, it is divided into six levels: perceiving and identifying, locating and extracting, understanding and integrating, analyzing and reasoning, appreciating and evaluating, transferring and applying [5]. As shown in Table 1 for details:

Table 1: SEC Consistency Analysis Mode

Content Theme		Cognitive Level					
		Perceiving and Identifying(A)	Locating and Extracting(B)	Understanding and Integrating(C)	Analyzing and Reasoning(D)	Appreciating and Evaluating(E)	Transferring and Applying(F)
Language	Vocabulary(1)						
	Syntax(2)						
	Rhetoric(3)						
	Language feature(4)						
Content	Fact(5)						
	detail(6)						
	Opinion(7)						
	Main idea(8)						
	Intention(9)						
	Emotion&Attitude((10)						
Structure	Macrostructure(11)						
	Microstructure(12)						

In this study, when coding the Reading and Thinking exercises of textbooks and Curriculum Standards, 12 two-dimensional content theme dimensions *6 cognitive level dimensions are adopted, that is, 12×6 two-dimensional matrix analysis framework. Before calculation, it is necessary to simplify the coding results and ratios of the curriculum standard coding and Reading and Thinking exercises in the textbook into a two-dimensional matrix analysis framework of 3×6, so the value of n is 18, which needs to reach the level of 0.05 from a statistical point of view, and the data matrix is significant and consistent. According to the 30 standard points calculated by Fulmer [6], the consistent reference value of this study should be between 0.8417-0.9208. Therefore, the lowest value of 0.8417 was used as the comparison reference value in this study, that is, Porter's value had to reach 0.8417 to have statistically

significant consistency.

2.3.2. Coding of Research Data

(1) Strict Selection of Coders

The research team consists of a professor of English teaching, a high school English teacher and several postgraduate students. Team members independently coded the Curriculum Standards and optional compulsory textbook exercises, and gradually reached a consensus after multiple rounds of meaning negotiation in coding.

(2) Coding of the New Curriculum Standard

The description of curriculum content in Curriculum Standards includes six elements: subject context, discourse type, language knowledge, cultural knowledge, language skills and learning strategies. This study aims at the consistency analysis of reading content, so the requirements for optional compulsory reading in the text knowledge and language skills module under the language knowledge section are selected. These two parts are accurately divided into 23 sub-items, and then the content theme and cognitive level dimension are classified according to the subdivided sub-items. For example, the expression "Perceiving and identifying discourse types" in discourse knowledge in Curriculum Standards. Among them, "Perceiving and identifying" belongs to "perceiving and identifying" of cognitive level, while "discourse types" belongs to the "Structure-Macrostructure" of content theme. Therefore, the encoding result of this requirement is A11 (Perceiving and identifying- Macrostructure).

According to this method, the Curriculum Standards were analyzed and sorted out, the statistical values and the corresponding ratio values were calculated, as shown in Table 2 and Table 3:

Table 2: Statistics of Curriculum Standard Coding Results

Content Theme	Cognitive Level					
	A	B	C	D	E	F
Language	2	0	2	1	0	0
Content	5	1	4	3	1	0
Structure	4	0	2	1	0	0

Table 3: Ratio of Curriculum Standard Coding Results

Content Theme	Cognitive Level					
	A	B	C	D	E	F
Language	0.0769	0.0000	0.0769	0.0385	0.0000	0.0000
Content	0.1923	0.0385	0.1538	0.1154	0.0385	0.0000
Structure	0.1538	0.000	0.0769	0.0385	0.0000	0.0000

(Note: In all figures and text in this article, Perceiving and Identifying--A, Locating and Extracting--B, Understanding and Integrating--C, Analyzing and Reasoning--D, Appreciating and Evaluating--E, Transferring and Applying--F)

2.3.3. Coding of the High School English Textbooks

According to the consistency analysis framework, the exercises in the Reading and Thinking part of textbooks were analyzed and sorted out, the statistical values and the corresponding ratio values were calculated, as shown in Table 4 and Table 5:

Table 4: Statistics of Coding Results of Textbook Exercises

Content Theme	Cognitive Level					
	A	B	C	D	E	F
Language	5	0	8	5	1	0
Content	29	31	17	19	27	19
Structure	1	10	5	4	0	0

Table 5: Ratio of Coding Results of Textbook Exercises

Content Theme	Cognitive Level					
	A	B	C	D	E	F
Language	0.0276	0.0000	0.0442	0.0276	0.0055	0.0000
Content	0.1602	0.1713	0.0939	0.1050	0.1492	0.1050
Structure	0.0055	0.0552	0.0276	0.0221	0.0000	0.0000

3. Data Analysis

3.1. Analysis of the Total Consistency

3.1.1. Analysis of the Overall Consistency Coefficient

The data of curriculum standard ratio value and textbook exercise ratio value are substituted into Porter consistency coefficient formula to get the consistency coefficient 0.5908, which is lower than the consistency reference value 0.8417. Therefore, there is no statistically significant consistency between the reading and thinking exercises in the textbook and the Curriculum Standards.

3.1.2. Overall Consistency Surface Analysis Diagram

In order to clearly and intuitively present the distribution of textbook exercises and Curriculum Standards in cognitive level and content theme dimension, this study draws the coding results of textbook exercises and Curriculum Standards into three-dimensional curved graph, as shown in Figure 1 and Figure 2. The X-axis represents the cognitive level dimension, and the Y-axis represents the content theme dimension.
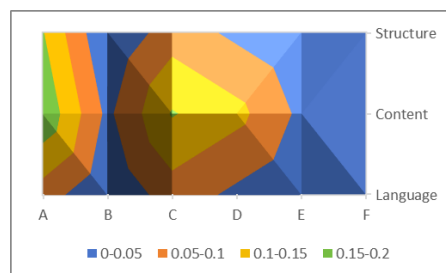
Figure 1: Content Theme and Cognitive Level Distribution of Curriculum Standards
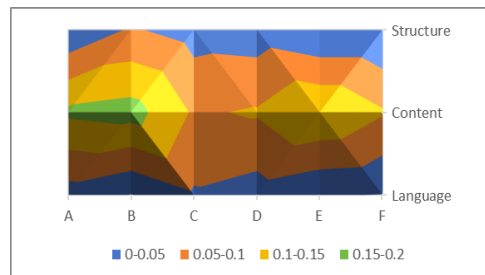

Figure 2: Content Theme and Cognitive Level Distribution of Textbook Exercises

Overall, the proportion of "A + Content" in Curriculum Standards is the largest, followed by C + Content; In the textbook exercises, B + Content accounts for the largest proportion, followed by A + Content combination. This indicates that both Curriculum Standards and textbook exercises focus on "Content", while Curriculum Standards pay more attention to the cultivation of "perceiving and identifying(A)" and "understanding and integrating(C)". Textbook exercises are more concerned with "locating and extracting (B)", "perceiving and identifying(A)".

3.2. Analysis of the "Cognitive Level"

From the perspective of cognitive level, the Curriculum Standards and textbook exercises are compared, and the results are shown in the figure 3 and Figure 4.
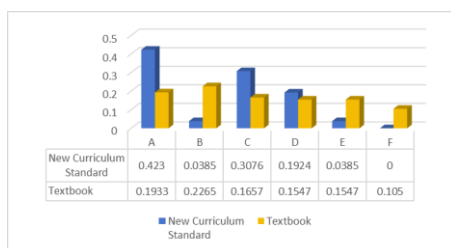

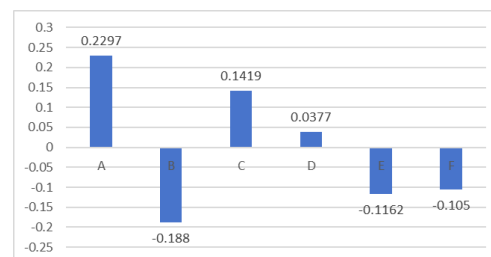*Figure 3: Cognitive Level Comparison*

Figure 4: Cognitive Level Difference

As can be seen from the figure 3 and Figure 4, the cognitive level dimensions of Curriculum Standards mainly focus on "perceiving and identifying(A)", "understanding and integrating(C)" and "analyzing and reasoning(D)". The ratio values were 0.423, 0.3076 and 0.1924, respectively. The cognitive level dimension distribution of the textbook exercises is relatively uniform, mainly focusing on "locating and Extracting(B)", "perceiving and identifying(A)" and "understanding and integrating(C)". The ratio values were 0.2265, 0.1933, and 0.1657, respectively. The main differences between Curriculum Standards and textbook exercises are "perceiving and identifying(A)" and "locating and extracting(B)". This indicates that the Curriculum Standards pay more attention to "perceiving and identifying(A)", while the textbooks tend to cultivate students' "locating and extracting(B)" ability. On the other hand, at the two levels of "appreciating and evaluating(E)" and "transferring and applying(F)", the proportion involved in the textbook exercises exceeds the basic requirements of the Curriculum Standards. This indicates that the textbook exercises have trained students' ability of "appreciating and evaluating(E)" and "transferring and applying(F)" to some extent. In particular, the ability of "transferring and applying(F)" is not clearly required for this high cognitive level in the Curriculum Standards.

3.3. Analysis of the "Content Theme"

From the perspective of cognitive level, the Curriculum Standards and textbook exercises are compared, and the results are shown in the figure 5-6.
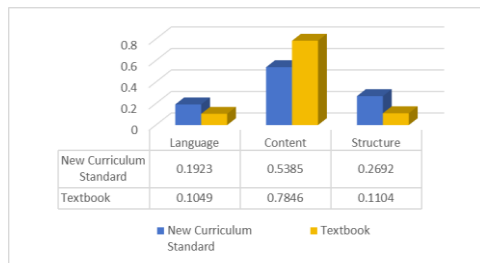

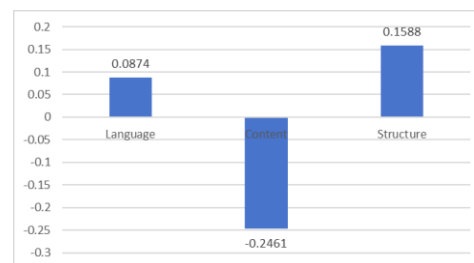Figure 5: Content Theme Comparison

Figure 6: Cognitive Theme Difference

As can be seen from the figure, the proportion of Curriculum Standards in the content theme dimension is: content > structure > language, and the ratio values are 0.5385, 0.1923 and 0.2692, respectively. The proportion of the textbook exercises in the content theme is content > structure > language, and the ratio values are 0.7846, 0.1104 and 0.1049, respectively. This shows that in terms of content themes, the proportion of textbook exercises and Curriculum Standards is basically the same. However, it can be seen from the difference chart that there is still a certain gap between the two in each dimension of the content theme. In the dimension of "content", the ratio value of the textbook exercises exceeds the curriculum standard, and in the aspect of "language" and "structure", the ratio value of the textbook exercises is lower than the curriculum standard.

4. Conclusion and Suggestions Based on the Data Analysis

4.1. Conclusion

According to the calculation formula of consistency coefficient and the results of critical value of consistency coefficient, the consistency coefficient of Reading and Thinking exercises in the optional compulsory textbook of the PEP (2019) and the curriculum standard have not reached the reference value. In terms of "cognitive level", both focus on "perceiving and identifying(A)", but the curriculum standard focuses on "understanding and integrating(C). The textbook exercises focus more on "locating and extracting(B)" ability. However, the proportions of "appreciating and evaluating(E)" and "transferring and applying(F)" exceed the basic requirements of the Curriculum Standards, which reflects the "combination of reading ability and thinking quality cultivation" of the teaching materials. It is conducive to the development of students' innovative thinking and the improvement of core literacy [7]. In the "content theme", the content, structure and language distribution of the two are basically the same, indicating that the curriculum standard and the textbook exercises have a good fit in the content theme.

4.2. Suggestions

4.2.1. Suggestions for Revision of Curriculum Standards

Curriculum standard is an important basis for compiling textbooks, selecting textbook contents, implementing classroom teaching and evaluating students' learning results. Therefore, the formulation of Curriculum Standards should pay attention to the accuracy and clarity of expression. First, the content expression of different sections of the course content should be consistent, and the requirements of the textbooks at each stage should be clearly and radiantly expressed [8]. Secondly, the curriculum language should be more standardized, and the description of the requirements should reach "operable, evaluable", to help the implementation of the Curriculum Standards.

4.2.2. Suggestions on the Compilation of Textbook Exercises

The compilation of textbook exercises should conform to the requirements of the curriculum standard in the cognitive level and the specific dimension of the content theme; We should not only meet the requirements of middle and low-level cognitive ability, but also take into account the cultivation of high-level cognitive ability. In the preparation of Reading and Thinking exercises in the optional compulsory stage, the requirements of reading ability should be expressed comprehensively in the Curriculum Standards. Reasonably involve reading activities, ensure that the activity design meets the basic requirements of the Curriculum Standards, and the elements of cognitive level dimension and content theme dimension should be reasonably allocated.

Specifically, at the cognitive level, the textbook exercises should pay attention to the gradient setting of difficulty. While cultivating students' "appreciating and evaluating(E)" and "transferring and applying(F)", Don't neglect to consolidate students' basic ability of "perceive and identify(A)" and "understand and integrate(C)".

In terms of content theme, textbook exercises should increase the design of reading activities at the level of "language" and "structure", strengthen the training of the language features and macro structure of the text, and help students improve their discourse awareness. At the "content" level, the processing of detailed information activities can be appropriately reduced, and the understanding of the main idea and structure of the article can be increased, so that students can grasp the text content from the macro discourse level, rather than paying too much attention to fragmented and superficial information.

4.2.3. Suggestions for English Reading Teaching in Senior High School

Teachers are the main implementer of teaching materials and play an important role in the classroom. Therefore, on the one hand, before reading teaching, teachers should carefully study the Curriculum Standards and textbooks, and analyze the requirements of Curriculum Standards from various aspects; Master the different requirements of textbook exercises in cognitive level and content theme dimension; Understand the intention of textbook writing and the design ideas of teaching activities and dig deep into the content of reading texts. On the other hand, teachers should also use textbooks flexibly according to students' learning conditions, choose and supplement the ratio of textbook exercises in different dimensions according to the actual situation in teaching activities, pay proper attention to the neglected elements of textbook exercises, and balance the proportion of table search and deep information in reading comprehension.

Acknowledgements

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