



Interdisciplinary Analysis of Textbooks of New Senior English for China

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Abstract: *Interdisciplinarity or interdisciplinary studies involves the combining of two or more academic disciplines into one activity. As the carrier of interdisciplinary materials, the interdisciplinary characteristics of teaching materials can effectively promote the integration of subject knowledge and the implementation of interdisciplinary education on the premise of satisfying students' interests and development. Through the content analysis method and quantitative analysis method, this paper conducts an interdisciplinary comparative analysis of readings of the required modules 1-5 of senior high school English textbooks of people's education press from an interdisciplinary perspective. It is found that the textbooks of the people's education press reflect the interdisciplinary nature in a balanced manner, and the proportion of humanities and social sciences is higher than that of other subjects. Given this study, the paper gives the possible reasons for selection of materials and themes, as well as the possible improvement directions and suggestions put forward by the author.*

Keywords: Interdisciplinarity, Textbook analysis, Senior English, Reading materials.

Cited as: Liang, J. (2024). Interdisciplinary Analysis of Textbooks of New Senior English for China. *Journal of Theory and Practice in Education and Innovation*, 1(1), 32–38. Retrieved from <https://woodyinternational.com/index.php/jtpei/article/view/129>

1. Introduction

1.1 Research Background

Interdisciplinarity refers to the quality or fact of involving different areas of knowledge or study. With repeated exposure to interdisciplinary thought, learners develop more advanced epistemological beliefs, enhanced critical thinking ability and metacognitive skills, and an understanding of the relations among perspective from different disciplines (Ivanitskaya L., Clark D., Montgomery G. & Primeau R., 2002) [1]. Compared with traditional single subjects, interdisciplinary learning focus on the integration of various disciplines and the process of reflection rather than the memory of knowledge or rote. It is more like the “authentic learning”, as Stephen Tchudi and Stephen Lafer (1997) mentioned, engaging students in situations that cause students to desire or feel a need for what the disciplines have to offer [2].

In the educational field, interdisciplinary teaching and learning has aroused teachers and scholars' attention and interests. Interdisciplinary teaching applied in English means connect English with other subjects to improve students' ability to think and solve problems, and more importantly, to apply. With the blossom of interdisciplinary teaching in English, interdisciplinarity of English textbooks seems to be extraordinarily vital. Textbooks are significant carries of teaching and the elementary basis of learning. The interdisciplinarity of teaching materials is particularly important for the successful realization of interdisciplinary teaching and learning. Stroller (2002) pointed out: "Language is the medium of content learning, and content is the resource of language learning and improvement [5]." In Stephen Tchudi and Stephen Lafer's opinion, there is great potential for interdisciplinary connectivity in real-world schools and that English language arts can play a major role in arriving at a practical coherence in school curricula because of the unique integrative role of language in human experience. It is true that “English always fit in,” because our discipline is, in its way, always about something other than itself [2].

1.2 The Reason and Significance of Choosing This Topic

Interdisciplinarity has become the basic concept of the compilation of English textbooks, and it has also become



an important indicator for evaluating the quality of textbooks. Based on National English Curriculum Standards for Common Senior High School, the compilation of English textbooks should be closely related to students' life, broaden their horizons and minds; and the content of English textbooks should be combined with the spirit of the times and take social needs into consideration. Interdisciplinary textbooks have significant meanings in talent cultivation for its standards such as flexible, fun, ideological and scientific way. In China, however, there are little studies of interdisciplinarity in English textbooks. Therefore, in this paper, the author tries to do some researches in interdisciplinary analysis of English textbooks, and takes the required modules 1-5 of senior high school English textbooks of people's education press (i.e. New Senior English for China student's book) as examples.

1.3 Definition of the Basic Concept

According to Wikipedia, the study of interdisciplinarity or interdisciplinary involves the combining of two or more academic disciplines into one activity (e.g. a research project). It draws knowledge from several other fields like sociology, anthropology, psychology, economics etc. It is about creating something by thinking across boundaries. It is related to an interdiscipline or an interdisciplinary field, which is an organizational unit that crosses traditional boundaries between academic disciplines or schools of thought, as new needs and professions emerge. Large engineering teams are usually interdisciplinary, as a power station or mobile phone or other project requires the melding of several specialties. However, the term "interdisciplinary" is sometimes confined to academic settings. Humphreys (1981) believed that interdisciplinary study means that students make effort to prove and explore knowledge derived from different subjects, which is closely related with certain questions in their living environment. The content of the knowledge may involve in multitude fields, such as natural sciences, human sciences, social sciences, music, P.E., arts and even communicative skills [4]. By doing this, learners are able to apply, discover, and develop these knowledge and skills in the process of learning multidisciplinary fields. Newell and Green (1998) considered interdisciplinarity as combining two or more disciplines to form a comprehensive understanding on a certain theme or matter [6].

2. Research Design

This part contains 3 key points, including research subjects, research methods, and research questions and objectives.

2.1 Research Subjects

This paper takes the required textbooks of New Senior English for China 1-5 volumes published by People's Education Press as examples. To be more detailed, the author completes the research on the reading materials on these textbooks for the reading materials are easy and straightforward for people to judge diverse discipline-oriented themes. In addition, by studying English reading materials for the college entrance examination, we find that the reading materials are diverse, and students score higher on topics that are closer to life, and score lower on articles on topics such as science. And these reading materials are chosen from the content.

2.2 Research Methods

Through quantitative analysis method, this paper conducts an interdisciplinary analysis of readings of the required modules 1-5 of New Senior English for China student's book from an interdisciplinary perspective.

Because there are many disciplines involved in high school textbooks, and the subject categories are more detailed. In order to scientifically calculate and analyze the subject categories of high school English textbooks, this article classifies the subjects with reference to the Chinese Science Discipline Classification Standard, combined with the high school curriculum. The subject categories are as follows: natural sciences, humanities and social sciences, medical sciences, engineering and technical sciences. To be more specific, (1) natural sciences include subjects like math, physics, chemistry, geography, biology and astronomy etc.; (2) humanities and social sciences include Chinese, history, politics, art, music, sports and health, ethnology and literature etc.; (3) medical sciences include medicine and related subjects; (4) engineering and technical sciences include information technology, architectonics, food and so on.

The paper will code for those reading materials in order to make the results clearer and more intuitive, so as to better draw possible conclusions.

2.3 Research Questions and Objectives

This paper makes statistics on the teaching of English interdisciplinary knowledge in senior high schools, in order to get a preliminary understanding of the current situation of English teaching in senior high schools, and puts forward corresponding suggestions based on the analysis of the results, hoping to provide some advice for the reform of English teaching and English textbooks in China.

(1) How many unit topics in high school English textbooks are subject oriented? What subjects are involved? What is the proportion of each subject?

(2) Whether the reading materials and themes in the textbooks published by PEP embody interdisciplinary characteristic? Is there an interdisciplinary balance?

(3) What subjects are most combined with English? What is the underlying reason?

3. Results and Analysis

3.1 The Results and Analysis of Unit Topics

Book 1 to 5 have totally 25 units, and every unit have one topic or theme. For example, in the Book 2 Unit 5 Music, its topic is about music, and its subject orientation is also music. In the process, the author adopts with the quantitative analysis. Twenty-five units are chosen to make a statistical table, so as to answer these questions – How many unit topics in high school English textbooks are subject oriented? What subjects are involved? What is the proportion of each subject? The statistic results are as follows:

Table 1: The analysis of unit topics

<i>Subjects</i>	<i>Units</i>	<i>Unit Quantity</i>	<i>Portion (%)</i>
Chinese	1.Friendship; 24. Making the news	2	8
History	2.English around the world; 6. Cultural relics	2	8
Music	10. Music	1	4
Ethnology	11. Festivals around the world; 19. Body language	2	8
Literature	13. The Million-pound Bank Note	1	4
Sports and health	7.The Olympic Games;	1	4
Geography	3.Travel journal; 4. Earthquake; 15. Canada - The True North; 22. The United Kingdom	4	16
Biology	9.Wildlife protection; 17. Working the land	2	8
Astronomy	14.Astronomy: the science of the stars	1	4
Medicine	25.First aid	1	4
Information technology	8.Computers	1	4
Food	12.Healthy eating	1	4
Others	5.Nelson Mandela - a modern hero; 16. Women of achievement; 18. A taste of English humor; 20. Theme parks; 21. Great scientists; 23. Life in the future	6	24

To classify the above subjects into 4 categories -- natural sciences, humanities and social sciences, medical sciences, engineering and technical sciences. We also make a table to find out that there is an interdisciplinary balance.

Based on Table 1, it is not difficult to find that 19 of the 25 units have obvious subject orientation, accounting for 76% , involving 12 disciplines, including Chinese, history, music, ethnology, literature, sports and health, information technology, geography, biology, astronomy, food and medicine. Among these disciplines, geography accounts for the highest proportion - 16%, which means these textbooks tend to be related to the knowledge of geography. From the perspective of the unit theme, these textbooks have a relatively high interdisciplinary coverage, and are more disciplinary-oriented. These findings are similar with Chen B. H. & Wu Y. W. (2012). In terms of selection of reading materials, these textbooks embody the interdisciplinary characteristics. As Humphreys et. (1981) pointed out, knowledge shall be involved in multiple domains.

Table 2: The analysis of categories

Categories	Involving subjects	Subject Quantity	Unit Quantity	Portion (%)
Humanities and social sciences	Chinese; History; Music; Ethnology; Literature; Sports and health	6	9	36
Natural sciences	Geography; Biology; Astronomy	3	7	28
Medical sciences	Medicine	1	1	4
Engineering and technical sciences	Information technology; Food	2	2	8
Others	/	6	6	24
Add up	/	18	25	100

According to the four types of subject categories on the basis of the Table 2, four subject categories are involved, and among them, humanities and social sciences are the top, accounting for 36%, followed by the natural sciences, accounting for 28%, and medical sciences and engineering and technical sciences, respectively, accounting for 4% and 8%. It can clearly be seen that their interdisciplinary balance is not so good, because these textbooks are more oriented towards the humanities and social sciences and natural sciences in the unit theme setting, however, the medical sciences and engineering and technical sciences are paid little attention.

3.2 The Results and Analysis of Reading Materials

In this part, the author focuses on the topic of each unit, analyzes the reading materials of each unit, and tries to find out which subjects are infused into a topic.

Table 3: The analysis of reading materials of each unit

Unit	Reading materials	Aggregation
1. Friendship	1) Anne's best friend - Ethology; 2) A letter from Xiao Dong - /; 3) Friendship in Hawaii - Ethology	Ethology
2. English around the world	1) The road to modern English - History & Geography; 2) Standard English and Dialects - History & Geography; 3) The Oxford English Dictionary - History	History; Geography
3. Travel Journal	1) Journey down the Mekong: Part I: The dream and the plan - Geography; 2) Part II: A night in the mountains - Geography; 3) The end of our journey - /	Geography
4. Earthquake	1) A night the earth did not sleep - Geography; 2) A letter of invitation - Politics; 3) The story of an eyewitness - Chinese	Geography; Politics; Chinese
5. Nelson Mandela - a modern hero	1) Elias' story - History & Politics; 2) The rest of Elias' story - History; 3) Two ideas about Bill Gates - /	History; Politics
6. Cultural relics	1) In search of the Amber Room - History; 2) A fact or an opinion? - /; 3) Big Feng to the rescue - /	History
7. The Olympic Games	1) An interview - Chinese; 2) The story of Atlanta - Literature; 3) Three inspiring stories about the Olympic Games - /	Chinese; Literature
8. Computers	1) Who am I? - Information technology; 2) Andy - the android - Information technology; 3) The sporting robot - /	Information technology
9. Wildlife protection	1) How Daisy learned to help wildlife - Biology; 2) Animal extinction - Biology & History; 3) The return of the Milu deer - Biology	Biology; History
10. Music	1) The band that wasn't Freddy the frog (II) - Music; 2) Cat's in the cradle - Literature	Music; Literature
11. Festivals around the world	1) Festivals and celebrations - History; 2) A sad love story - /; 3) Winter Carnival in Quebec - Ethology	History; Ethology
12. Healthy eating	1) Come and eat here (1) - Food; 2) Come and eat here (2) - Food; 3) For/ Against building a McDonald's - /	Food
13. The Million Pound Bank Note	The Million Pound Bank Note 1) Act I, Scene 3 - Literature; 2) Act I, Scene 4 - Literature; 3) Act II, Scene 4 - Literature	Literature

14. Astronomy: the science of the stars	1) How life began on the earth - Biology & History;	Biology; History; Physics
	2) A visit to the moon - Physics;	
	3) Caught by a black hole - Physics;	
15. Canada - "the True North"	1) A trip on "The True North" - Geography;	Geography
	2) "The True North" from Toronto to Montreal - Geography;	
	3) Iqaluit - the frozen town - Geography	
16. Women of achievement	1) A protector of African wildlife - Biology;	Biology; Chinese
	2) A good example for me - Chinese;	
	3) Elizabeth Fry - Chinese	
17. Working the land	1) A pioneer for all people - Chinese & Biology;	Chinese; Biology; History
	2) Organic farming - Biology;	
	3) An early farmer pioneer - History & Biology	
18. A taste of English humour	1) Nonverbal humour - /;	Ethology;
	2) English jokes - Ethology;	History
	3) An April Fool's jokes: the noodle harvest - History	
19. Body language	1) Communication: no problem? - Ethology;	Ethology
	2) Showing our feelings - Ethology;	
	3) The open land - A universal sign - Ethology	
20. Theme parks	1) Theme parks - Fun and more than fun - /;	/
	2) Futuroscope - Excitement and learning - /;	
	3) The Polynesian Cultural Centre - /	
21. Great scientists	1) John Snow defeats "King Cholera" - History & Medicine;	History;
	2) Compemicus' revolutionary theory - History & Astronomy;	Medicine;
	3) Finding the solution - Math	Astronomy; Math
22. The United Kingdom	1) Puzzles in geography - Geography & History;	History; Geography;
	2) Sightseeing in London - History & Geography;	Ethology
	3) A particular British celebration - Ethology	
23. Life in the future	1) First impressions - /;	Chinese
	2) I have seen amazing things - Chinese;	
	3) Rising to a challenge - /	
24. Making the News	1) My first work assignment - Chinese;	Chinese
	2) Getting the "scoop" - /;	
	3) Searching for the truth - /	
25. First aid	1) First aid for burns - Medicine;	Medicine
	2) Heroic teenager receives award - /;	
	3) Is your home safe? - /	

This paper is different with most of previous studies in terms of research subjects of the Table 3. Reading, reading Tasks and projects were selected by the previous studies (Chen Baihua, & Wu Yuewen, 2012; Sun Na, 2014; Wang Mengxia, 2019); while the study chooses only reading materials. Also, Chen B. H., & Wu Y. W. adopted sample survey, and this study employs general survey in order to get an overall and holistic outcome. Through investigation, although the digitals are slightly different with the previous studies. The author still gets the similar findings.

From Table 3, we can find that, although there are some units without evident disciplinary orientation, these units' reading materials are disciplinary-oriented. Taking Book3 Unit1 - Women of achievement as an example, its reading materials have combined two subjects - Chinese and biology. It means that textbooks discuss the same topic from different perspectives and disciplines, which can broaden students' horizon, arouse their interests and inspire their learning motivation. Furthermore, through counting the involving subjects, history appears the most, a total of 10 times, followed by geography, ethology, Chinese and biology, appearing 5, 5, 4 and 4 times respectively. Compared with Table 1, the rank order is geography (top1), history, ethology, Chinese and biology. The results are basically consistent. From disciplinary diversities, there are 13 units involving no less than 2 subjects, 11 units involving one subject and only one unit involving no subject except English. The results show that these textbooks are not only combined with a single discipline, but also focuses on the integration and penetration of knowledge in multiple disciplines. Under the same theme, the integration of knowledge of multiple subjects can help students develop and expand knowledge of other subjects while mastering English, cultivate students' multiple intelligence and promote their all-round development.

4. Conclusion and Suggestions

Given the above research, the paper wants to draw a conclusion and give some possible suggestions to the textbook compilation and teachers from interdisciplinary perspective.

In view of the above study, these textbooks better reflect the interdisciplinary nature of textbook compilation. From the perspective of the unit theme, 19 of the 25 units have obvious subject orientation, among which geography accounts for the highest proportion - 16%, which means these textbooks tend to be related to the knowledge of geography. With the strengthening of economic globalization and convenient transportation, the student travel rate is also on the rise. Therefore, the combination of English and geography knowledge can provide students with a broader vision and solve some specific problems related to travel. Based on every unit's reading materials, we find that, although some units' themes do not have distinct disciplinary orientation, the reading materials of these units are related to other subjects, in which history appears most frequently. Language ability and cultural understanding ability are usually correlated, if you want to learn English well, the understanding of a country's history and geography is particularly important. Combining English teaching with the history and geography, enables students to master English, at the same time, has a more profound understanding of the historical and geographic knowledge behind the language. It is reasonable to combine English with geography and history.

We can also find that these textbooks are more oriented towards the humanities and social sciences and natural sciences in the unit theme setting and reading materials, however, the medical sciences and engineering and technical sciences are paid little attention. It can clearly be seen that their interdisciplinary balance is not so harmonious. The unbalanced distribution of disciplines cannot provide equal opportunities for the development of various disciplines, which is not conducive to the improvement of students' multiple intelligences, the establishment of a wide range of disciplinary knowledge, and the accumulation of students' comprehensive knowledge and ability. Based on all the findings, I want to give possible suggestions for the compilation of textbooks and teachers:

(1) Harmonizing disciplinary equilibrium

Disciplinary equilibrium of textbooks has a direct influence on the comprehensive development of students' interdisciplinary knowledge and abilities. Those textbooks need to increase the proportion of the two categories, medical sciences, engineering and technical sciences, as a whole, and focus on the balance of natural science and humanities and social sciences.

(2) Broadening disciplinary span

Given Table 3, Almost half of the units combine only one subject. The disciplinary span of textbooks is relatively narrow. In the selection of reading materials, we can consider learning and exploring unified topics or issues from more different disciplines, and the span between disciplines can be appropriately enlarged.

(3) Improving teachers' disciplinary awareness and ability

On the whole, these textbooks have a strong subject diversity, which places higher demands on the teachers. Teachers using these textbooks must have an awareness of interdisciplinary teaching and master a broaden knowledge besides English. In reality, nevertheless, a great number of English teachers may have a professional knowledge in English, but they do pay close attention to other disciplines. It is necessary to improve their disciplinary awareness and ability.

5. Limitations

Through reading, students can supplement the original knowledge and add new information to the information reserve system. Therefore, if you add knowledge from other subjects to English reading materials, and activate students' knowledge of different subjects effectively, reading materials will play a greater role than a single language learning role. However, this paper focusing on the single object - reading materials, also has shortcomings. As we know, as English textbooks, there are many parts and activities to help students to learn English, such as exercises and listening or speaking or writing materials. All of these contents can embody and integrate knowledge of other disciplines. To some extent, this paper is limited to the reading materials, which will cause this paper

cannot investigate the interdisciplinary topic in a comprehensive way. Otherwise, the method of study is single. Through quantitative analysis method, this article conducts an interdisciplinary analysis of the required modules 1-5 of senior high school English textbooks of people's education press.

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