A Statistical Modeling-Based Study of Thematic Distribution of English Children's Literature and Its Impact on Educational Content Selection

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Abstract English children's literature, as an important resource for elementary school English education, has distinctive regional, national and multicultural characteristics. This study adopts the LDA theme model to mine the themes of English children's literature since the 1970s, and verifies its teaching effect through a semester-long teaching experiment. The results show that the themes of English children's literature can be summarized into four categories: love, romance, growth and pursuit; after the introduction of English children's literature, the English writing scores of students in the experimental class increased from 62.18±5.87 to 81.64±3.76, and the total number of words in writing increased from 98.54 to 132.85, whereas those of the control class only increased from 62.27±6.81 to 64.76±5.94 points; the mean value of English learning interest of the students in the experimental class increased from 2.15 to 3.28 points, and the vocabulary learning interest, reading learning interest and classroom participation motivation increased significantly ($p < 0.05$). Conclusion: The thematic distribution of English children's literature based on statistical model mining provides a scientific basis for the selection of educational content; the targeted integration of English children's literature into elementary school English teaching can effectively improve students' English writing ability and learning interest, and promote the quality of elementary school English education.

Index Terms English Children's Literature, Theme Distribution, LDA Model, Theme Mining, English Education, Primary English

I. Introduction

Children's literature in English, occupies an important position in the global education system [1]. Children's literature has diverse themes, covering scientific and technological development, interpersonal communication, morality and ethics, family relationships, environmental protection, adventure and fantasy, etc. Different themes directly affect children's cognition and three views. Specifically, presenting cultural connotations in children's literature can cross cultural and national boundaries, allowing children to learn about different cultures through reading, while promoting the improvement of reading ability and enhancing language acquisition [2]-[4]. For example, works such as Hans Christian Andersen's Fairy Tales and Grimm's Fairy Tales have been widely spread around the world. In children's literature, rich imagination and plots can stimulate children's thinking and develop their observation, thinking and creativity. In the process of reading, children can learn different viewpoints and ways of thinking, broaden their horizons, and develop their logical and critical thinking skills [5], [6]. The storyline and characters in children's literature can often cause children's empathy and emotional resonance. Through reading these works, children can learn the ability of emotional expression and emotion management, and develop their empathy and emotion cognition, and the storylines and characters in children's literature can also become the reference and imitation objects for children's emotional development, enhance their empathy, and establish a positive emotional attitude [7]-[10].

In addition, children's literature often incorporates some moral education content, such as friendship, justice, honesty, bravery and so on. By reading these works, children can learn the correct moral concepts and values, and develop their moral judgment and moral behavioral abilities. The positive character images and behaviors in children's literature can be the role models for children's moral development, shaping character and forming correct moral concepts and behavioral habits [11]-[14]. Therefore, choosing appropriate children's literature to form educational content becomes one of the priorities of educators. The selection of educational content needs to balance two trade-offs, namely, the speed of selection and the suitability of themes and content, the cultural heritage of classic literature and the emerging thematic needs, exposing the drawbacks of selection based on educators'

experience, which is inefficient, subjective, and lacks comprehensiveness [15]-[17]. Exploring objective and efficient methods of theme analysis and selection has become a necessary topic for educators.

English children's literature is characterized by fun, childishness and fantasy, and its rich plots and easy-to-understand truths make it an ideal teaching resource for elementary school English education. With the global popularization of English education, how to choose appropriate English children's literature to promote the improvement of primary school students' English expression ability has become an important topic in English education research. English children's literature generally regards the 1970s as the beginning of its academic research and the establishment of its independent discipline. After nearly fifty years of development, the critical discourse system of English children's literature has been formed, and its works have gradually presented distinctive regional, national and multicultural characteristics. These works either reflect the actual life of British and American children, or come from the original classic stories of famous authors, and are integrated into the English children's culture, providing rich language materials and cultural background for English education in elementary school. In the context of the new curriculum reform, English education emphasizes the unity of instrumentality and humanity, and the multi-topic and multi-genre of English children's literature precisely meets this requirement. However, there is a lack of systematic research on the thematic distribution of English children's literature, which limits the scientific basis for educators to choose teaching content. In order to fill this research gap, this study adopts statistical modeling to dig deeper into the themes of English children's literature and explore the effects of its application in primary English education. Specifically, this study first constructed a corpus of English children's literature and used the LDA (Latent Dirichlet Allocation) theme model to identify and analyze the thematic distribution of the works; then it conducted an empirical study on the effect of English teaching incorporating English children's literature through a semester-long teaching experiment. Two parallel classes in the second grade of an elementary school in Wujiang District, S City, were selected as the experimental subjects. Under the premise of ensuring the consistency of the background, the experimental class adopted the teaching method of integrating English children's literature, while the control class adopted the traditional teaching method. The actual effects of integrating English children's literature into English teaching were investigated through pre- and post-assessment of students' English writing ability and learning interest. The results of the study will provide a scientific basis for English educators to select appropriate children's literature, provide theoretical support for the optimal design of the content of English education in elementary school, and thus promote the comprehensive improvement of primary students' English expression ability. At the same time, this study will also enrich the theoretical system of English children's literature research and provide new perspectives and methods for the classification and evaluation of English children's literature. Through the combination of statistical modeling and educational practice, this study not only explores the thematic distribution law of English children's literature works, but also verifies the effectiveness of these works in promoting primary school students' interest in English learning and improvement of their writing ability, which provides a feasible path to improve the quality of English education in elementary school.

II. Integration of English children's literature into the content of English language education

English children's literature academics generally regard the 1970s as the beginning of the academic study of children's literature and the establishment of an independent discipline, which is marked by the creation of a number of professional academic journals and associations specializing in children's literature critical research. Since then, the study of English children's literature has entered the field of literary research from the fields of pedagogy and librarianship. After nearly fifty years of development, the recognition of the academic identity of English children's literature research has become the consensus of the academic community, and the English children's literature critical discourse system has been formed. And English children's literature can give students more diverse contents in English education and provide diversified resources for promoting students' English expression ability.

II. A. Knowledge of Children's Literature in English
II. A. 1) Characteristics of Children's Literature in English
In the process of generation and development, English children's literature has gradually got rid of the restraints of traditional world children's literature and revealed its own character [18]. Specifically, English children's literature is roughly characterized by some of the following features:

(1) Distinctive regional characteristics. Different natural environments, economic characteristics, historical traditions and ethnic backgrounds of various regions provide diversified materials and inspirations for the creation of English children's literature, and English children's literature produced in different regions is also unique in terms of background, themes and styles, with distinctive regional characteristics.

(2) Embodiment of ethnicity. Equally important as the sense of regional loyalty is the sense of national identity and belonging. Especially after the end of the Second World War, some English writers have become increasingly aware of their national consciousness and the concept of national identity, and are no longer satisfied with being a "vassal" of culture and values, but hope to get rid of the influence of "outsiders" and adapt to the new role of an independent country, and seek an independent cultural identity. Instead, they wish to escape from the influence of "outsiders", to adapt to the new role of an independent State and to seek an independent cultural identity.

(3) Multiculturalism. Immigrants from all over the world live in different immigrant communities, bringing with them different languages, cultures and worldviews. In order to maintain social stability, protect the history and culture of different ethnic groups, and promote the harmonious coexistence of different ethnic groups, the British government has long been promoting the policy of "multiculturalism". The government's support has promoted the emergence of multiple voices in English children's literature, and "diversity" has become a distinctive feature of English children's literature since the 1970s. Different ethnic backgrounds have had a profound impact on the creativity of children's writers and illustrators. After all, while creating for children, they undoubtedly have to incorporate their own cultural expectations, worldviews, outlooks on life and values into the world of children's literature [19].

II. A. 2)   The Role of Teaching English Children's Literature
English children's literature is the literature of Anglo-American countries that is child-oriented, fits with children's aesthetic consciousness and developmental psychology, and is beneficial to children's healthy growth in spiritual life, and has distinctive features such as extremely rich in children's interest, full of fantasy, simple and intuitive storyline, and simple and easy-to-understand language. In children's education, there are functions such as aesthetics, cognition, entertainment and moral education. These works either reflect the actual life of British and American children, or come from the original classic stories of famous authors, and are integrated into English children's culture. Therefore, the implementation of English children's literature teaching in elementary school plays an important role.

(1) Meet the needs of primary school students' cognitive development. Elementary school students are full of curiosity and dare to explore the outside world. The elementary school stage is to cultivate the basic reading stage, the introduction of English children's literature in this period can make the students immerse in the real and simple, original language materials, get the nourishment of language education, in line with the needs of their mental development. Teachers guide students to read the text and accumulate language, realizing the "instrumentality" of language. At the same time in the process of language taste, realize the language of thought and emotion, so that the students in the reading cultivated sentiment, so that the "humanities" can be traceless penetration in the teaching.

(2) The needs of the new curriculum reform. In view of the "standard" emphasizes the instrumental and humanistic, cultivate the English ability of primary school students to stimulate and cultivate interest in English learning, master a certain degree of basic knowledge of English, the use of listening, listening, reading and writing skills, and understanding of the differences between Chinese and Western cultures, and so on. Therefore, it is very important for students to read and watch English, which is a foreign language, and English children's literature is suitable for this standard because of its many themes and genres.

II. B. Teaching Content Selection of English Children's Literature
II. B. 1)   Fully grasp the themes of children's literature
In the selection of English teaching content, choosing appropriate English children's literature can significantly improve the English expression ability of primary school students. Only by fully grasping the themes of English children's literature can it be a better vehicle for teaching English expression to primary school students.

The exploration of the significance of the theme is built on the basis of the discourse, and the overall design of teaching is actually centered on a specific theme. Setting effective teaching goals around the theme of the reading material is an important part before reading in English. Teachers' clear teaching objectives can effectively guide and promote English reading teaching.

In primary English reading classes, setting teaching objectives through thematic exploration of texts and discourse is a tool used in high-quality classrooms to accurately determine whether the English program is achieving the desired results, and students are guided by the teacher to explore the meaning of the discourse themes in order to acquire the target language and develop higher-order thinking. Students learn the target language through English children's literature, acquire humanistic knowledge, understand the relationship between human beings and society, receive training in thinking, and develop their personal emotions, pointing to the theory and practice of scientific parenting, which reflects the profoundness of a high-quality English reading classroom.

II. B. 2)   Complying with the Laws of English Language Cognition
The main task of English education is to cultivate students' English language ability, and to improve the effect of

teaching should seize the cognitive law and learning characteristics of students learning language. Elementary school students learning language knowledge have their own cognitive rules and characteristics, and the choice of educational content should also fully comply with the distribution of themes in English children's literature. Because primary school students are in the period of children and adolescents, curiosity, desire for knowledge and acceptance are generally strong, like to explore and contact with new things, and when they encounter problems that they can't figure out or understand, they tend to solve them by association and imagination. However, due to the limitations of the learning environment and conditions, students lack the opportunity of real experience, and encounter some difficulties in learning English language knowledge, and the development of English language thinking is not very satisfactory.

Children's literature in English is characterized by fun, childishness and fantasy, in which the plots are vivid and interesting, and the reasoning is simple and easy to understand. Carrying out the teaching of English children's literature in elementary school English education is very much in line with the characteristics of primary school students' learning of English language knowledge, and conforms to their cognitive law in language learning. By combining English teaching with children's literature teaching, those children's literature materials which are full of imagination, vivid storyline, illustrated and skillfully worded will quickly arouse the learning interest of primary school students and satisfy their curiosity and desire to explore new things. Promote the development of language practice ability and comprehensive quality of primary school students in the English course of study.

III. Thematic Distribution Mining Model for English Children's Literature

The contents of British and American children's literature are close to life, full of fantasies, and the language is easy to understand. The introduction of English and American children's literature in elementary school English teaching is in line with the new curriculum standard of English for compulsory education, students' psychological characteristics and interests. Therefore, in the English teaching of compulsory education, not only teaching textbook knowledge, but also make full use of English and American children's literature to cultivate students' English literacy. The need to deeply explore the thematic distribution of English children's literature can provide reliable data support for the selection of English children's literature that is more favorable to the English education of primary school students.

III. A. Theme Extraction Model for Children's Literature
III. A. 1) Mathematical principles of LDA subject modeling

The LDA model is a generative probabilistic model whose basic idea is that a document consists of a random combination of a number of potential topics, each of which is determined by a distribution of words [20]. In the LDA model, each document in the corpus D is generated by the following process:

(1) Select $N \sim Poisson(\xi)$.

(2) Choose $\theta \sim Dir(\alpha)$.

(3) For each specific word w_n of the N words:

Choose a theme, denoted z_n, $z_n \sim Multinomial(\theta)$. Choose a word w_n from the probability distribution $p(w_n | z_n, \beta)$, where $p(w_n | z_n, \beta)$ is a polynomial distribution over the topic z_n

This model makes some simplifying assumptions. First, the model assumes that the dimension k of the Dirichlet distribution is known and fixed. Second, the probability of word generation is determined by a matrix β of $k \times v$, where $\beta_{i,j} = p(w^j = 1 | z^i = 1)$, which the model assumes is an estimable and fixed quantity. Moreover, N is independent of the other generating variables (i.e., θ and z), so it is an auxiliary variable whose randomness is ignored in the subsequent sections of the paper.

The probability density function of the K-dimensional Dirichlet random variable θ is as follows:

$$p(\theta | \alpha) = \frac{\Gamma\left(\sum_{i=1}^{k} \alpha_i\right)}{\sum_{i=1}^{k} \Gamma(\alpha_i)} \theta_1^{\alpha_1 - 1} \cdots \theta_k^{\alpha_k - 1} \tag{1}$$

where the parameter α is a k-dimensional vector with elements $\alpha_i > 0$ and $\Gamma(x)$ is the Gamma function. The Dirichlet distribution belongs to an exponential family of distributions with finite-dimensional sufficient statistics and is covariant with a polynomial distribution. These properties will facilitate the subsequent inference and parameter estimation of the LDA model.

Given the parameters α, β, the joint distribution of β, z, $\mathbf{w}$ is:

$$p(\theta, z, w \mid \alpha, \beta) = p(\theta \mid \alpha) \prod_{n=1}^{N} p(z_n \mid \theta) p(w_n \mid z_n, \beta) \tag{2}$$

where $p(z_n \mid \theta)$ is θ_i and i satisfies $z_n^i = 1$. Integrating over θ and summing over z, the edge density function of a document is obtained as:

$$p(W \mid \alpha, \beta) = \int p(\theta \mid \alpha) \left(\prod_{n=1}^{N} \sum_{z_n} p(z_n \mid \theta) p(w_n \mid z_n, \beta) \right) d\theta \tag{3}$$

Finally, the edge density function for each document is multiplied to get the density function of the whole corpus as:

$$p(D \mid \alpha, \beta) = \prod_{d=1}^{M} \int p(\theta_d \mid \alpha)$$
$$\left(\prod_{n=1}^{N_d} \sum_{z_{dn}} p(z_{dn} \mid \theta_d) p(w_{dn} \mid z_{dn}, \beta) \right) d\theta_d \tag{4}$$

The probabilistic geometric model representation of the LDA model is shown in Figure 1. The LDA model is divided into three layers. Parameters α, β are corpus layer parameters with values that remain constant throughout the corpus generation process. The variable θ_d is a document layer parameter that takes the same value in the same document. Finally, the variables z_{dn}, w_{dn} are word-level parameters whose values are generally different for different words.
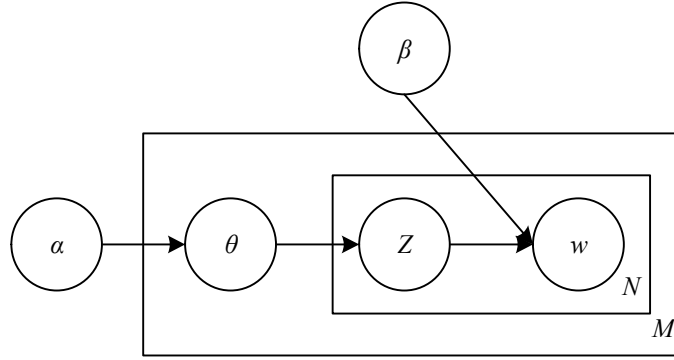

Figure 1: Geometric model of LDA model

III. A. 2) Topic number determination and model evaluation

The number of LDA topics is determined, PyLDAvis visualization is good, and the topics are independent of each other with low overlap. If multiple classification results with low overlap are obtained, the corresponding model is optimal when the average similarity of the topic structure is the smallest [21]. The PyLDAvis result analysis can be expressed as:

$$saliency(w) = frequency(w) * \left[sum\_tp(t \mid w) * \log(p(t \mid w) / p(t)) \right] \tag{5}$$

$$\mathrm{Re}levance(w \mid t) = \lambda * p(w \mid t) + (1 - \lambda) * p(w \mid t) / p(w) \tag{6}$$

where w is term, i.e. feature phrase, and t is topic, i.e. theme.

If λ is close to 1, then the more frequently occurring words under the topic are more relevant to the topic; if λ is closer to 0, then the more special and exclusive words under the topic are more relevant to the topic.

The evaluation of LDA effect can be seen directly in the visualization results, and the principle is to extract the principal components as dimensions, distribute the topics to these two dimensions, and the proximity of the topics to each other is expressed by their positional proximity to each other. The bubble distance is adopted as the JSD distance, which can be considered as the degree of difference between the topics, and the fact that the bubbles have an overlap indicates that there is a crossover of feature words in these two topics.

Typically, JS scatter measures the similarity of two probability distributions, and in general, JS scatter is symmetric and takes values between 0 and 1. It is defined as follows:

$$JS\left(P_1 \| P_2\right) = \frac{1}{2} KL\left(P_1 \left\| \frac{P_1 + P_2}{2} \right.\right) + \frac{1}{2} KL\left(P_2 \left\| \frac{P_1 + P_2}{2} \right.\right) \tag{7}$$

where P_1, P_2 denote the probability distributions of the two sets of data.

KL Scatter is also known as Relative Entropy, Information Scatter, Information Gain. KL Scatter is a measure of the asymmetry of the difference between two probability distributions P and Q. It is defined as follows:

$$KL\left(P \| Q\right) = -\sum_{x \in X} P(x) \log \frac{1}{P(x)} + \sum_{x \in X} P(x) \log \frac{1}{Q(x)} \tag{8}$$

III. B. Thematic Mining in English Children's Literature
III. B. 1) Sources of data on children's literature

There is no corpus of English children's literature available for researchers, so this paper should collect relevant corpus by itself to build a representative corpus of English children's literature. Regarding the representativeness of the corpus, the so-called corpus, as a large collection of linguistic materials, aims at reflecting the whole picture of real language to the maximum extent. From a statistical point of view, the larger the size of the corpus, the more representative it is. In fact, the representative corpora (e.g. COCA, MICASE, etc.) often used by corpus researchers can't cover 100% of all the language materials (including spoken and written language, etc.) we use. This is because, on the one hand, language output activities are ongoing and the corpus people output accumulates over time. On the other hand, the reason is the various constraints that exist in the way the corpus is collected. Take the Contemporary English Corpus COCA as an example, COCA has a capacity of 560 million words so far, and it is still expanding at a rate of 20 million words per year. Therefore, in corpus linguistics, samples represent the whole, and it is feasible to study the overall characteristics through samples.

In order to ensure the typicality of the corpus sample, this paper exhaustively collects all English children's literature published since the 1970s to build a corpus. One of the important reasons for adopting this way of sample selection is that most of the published English children's literature has a high circulation, and some of the works are stably collected as texts for compulsory education and often chosen as excellent literary readings for children, which can ensure the representativeness of the corpus to a considerable extent. Taking this approach to build the corpus will also make the results of the thematic distribution of English children's literature more convincing. Therefore, taking the aforementioned works as samples for the construction of the corpus is also a kind of maximum reflection of the real language within the feasible scope (the purpose of the corpus), which is scientific and persuasive to a certain extent.

III. B. 2) Results of theme identification in children's literature

After model training and parameter adjustment, the number of model iterations was determined to be 300 to ensure model stability. Figure 2 shows the confusion degree graph. When the confusion degree value graph is at the lowest point, the number of recognized topics is considered to be the most reasonable, and the K value at this time is the optimal number of topics. Combined with the perplexity curve, it can be seen that when the K value is 4, the differentiation between the themes is significant, thus determining that the optimal number of themes in English children's literature is 4.
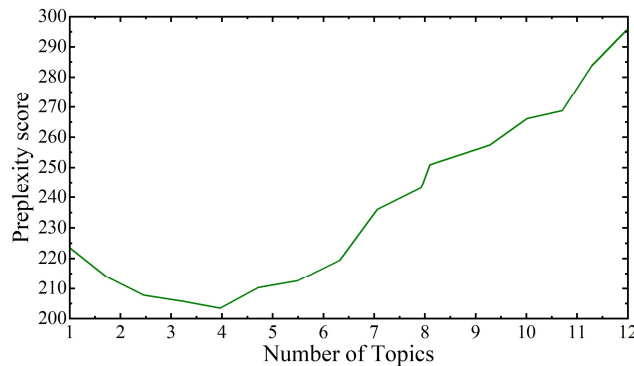

Figure 2: Confusion graph

In addition, a visualization analysis was carried out using the PyLDAvis package, and the results are shown in Figure 3. Among them, Fig. 3(a)~(b) shows the inter-theme distance map and Top20 total word frequency changes

of English children's literature, respectively. After the LDA outputs the topic lexical items, it is necessary to summarize and label the names of these four topics manually. The settings show the top five theme terms identified by the LDA model in terms of the frequency of occurrence of each theme, and the specific meanings of the themes are summarized by interpreting the articles in which these four theme terms are found. As a result, the four thematic labels of British children's literature were obtained as love, romance, growth and pursuit themes.

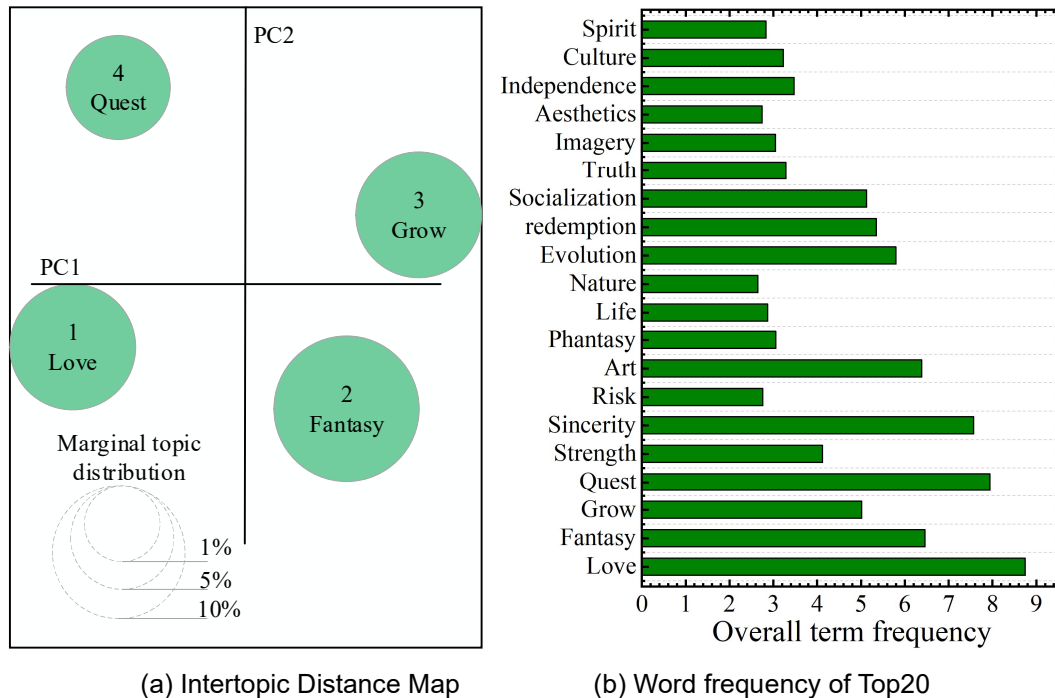(a) Intertopic Distance Map   (b) Word frequency of Top20

Figure 3: Topic visualization results

Love and romance are the two eternal themes of English children's literature, and they were also the main themes of Victorian British fantasy literature. Children's literature is the literature of love, and writers convey their sincere love for children through their works, and in this way cultivate love in children. Romance is also a major theme in children's literature, and Victorian English writers vigorously wrote romance in their textual worlds, revealing and fantasizing the more beautiful and magical aspects of society through romance, as well as dealing with romance in an artistic way. In addition, English children's literature is also growth literature. Growth is the state of children's life, children must grow up and finally realize their socialization process, excellent children's literature always pays attention to and expresses children's growth, and really helps children's growth. English children's literature usually constructs the story in a thematic pattern of pursuit, in which the young protagonist explores the external and internal worlds through a journey of pursuit, and then learns about himself and grows up in the experience.

English children's literature cultivates and optimizes children's spiritual world through the aesthetic pleasure of artistic visualization, so that they can form the most basic and fundamental values, outlook on life, morality and aesthetics of human beings, consolidate the foundation of human nature and realize their own perfection. English children's literature is a dialog between adults and children, carrying the deep love and care of human beings for the next generation and the expectation of growth, which is of extraordinary significance to the growth of children. It can be said that English children's literature is a "gift of love" for children, providing them with the spiritual food they need to grow up, from which they not only get spiritual pleasure, but also have a healthy and rich emotional life. Excellent English children's literature carries the author's rich life experience, conveys love to the young readers, and enlightens and nourishes their lives.

The protagonists in children's literature are experiencing various adventures in their own strange realm or realm of reality, and their adventures all follow a common theme pattern - the pursuit. The quest allows them to learn about themselves, explore the world, and grow to maturity. In real life, children are often constrained by adults from exploring the world as they wish, but with the help of fantasy, this problem is solved. Children are rich in imagination, and often imagine themselves going to heaven and earth, getting rid of evil spirits and demons in heroic feats, so the pursuit adventures of small protagonists in fantasy novels are most easily accepted and recognized by child readers; in addition, fantasy novels rehearse the tests and problems faced by children in the course of their real-life

growth, which contributes to children's growth.

IV. Integration of English children's literature into English language teaching practices

The learning of any language requires listening to and reading a large number of oral stories and literature, and the learning of the English language is no exception. Children's literature, with young people as the target readers, is naturally a very important teaching resource. Elementary school is a good period for language learning, and in elementary school English teaching, we should pay attention to the introduction and selection of English children's literature. This chapter mainly puts forward the practice of elementary school English teaching based on English children's literature, explores the specific influence on the teaching effect of elementary school English under English children's literature, and aims to further enhance the quality of elementary school English teaching.

IV. A. Research Experimental Subjects and Instructional Research Designs

IV. A. 1)   Subjects of the ELT experiment

The subjects were students in two parallel classes in the second grade of an elementary school in Wujiang District, S city, and were naturally divided into experimental and control classes according to the classes, with the second (1) class as the experimental class and the second (2) class as the control class. The experimental subjects had similar English learning backgrounds, all of them had been learning English since grade one, the amount of English class time was three periods per week, and the textbook used was Oxford Primary English. Both classes were taught by the same English teacher since they entered elementary school.

The ratio of males to females and the age of the students in the two classes were basically the same, and the students in the two classes basically did not have any experience of learning English outside of the classroom. After entering the second grade, the school rearranged all the students into parallel classes, and the overall interest and learning habits of the students in the two classes were similar. Most of the family members of the students in both classes were migrant workers, so there was a lack of English tutoring and limited awareness of English education, and very few students received English education outside the classroom. The courses offered in the two classes were identical. The experimental class began in the second semester with the addition of reading of English children's literature to supplement the traditional teaching method. This can be done by assigning students to read relevant English children's literature at home, by organizing a unified English children's literature teaching class in the classroom, or by organizing independent English children's literature reading classes in the classroom. The control class still used the traditional English teaching method.

IV. A. 2)   English language teaching design process

This English teaching experiment started from July semester of 2023 to the end of February semester of 2024, and the total experiment lasted for one semester. Figure 4 shows the specific process of this English teaching experiment, the overall process of the study is divided into three phases, in order of research preparation phase, teaching quality management experiment implementation phase, data results analysis phase.

(1) Pre-research preparation

After first formulating and establishing the overall research purpose and problem of the experiment that is to enter the research preparation stage, the work items include open recruitment of experimental group teachers for the whole school's English subject group, the formation of teachers' experimental group team, and the identification of experimental group teachers' classes in which the experimental class. Teachers of the experimental group for training, focusing on the purpose of the experiment and management strategies, and guidance and training of experimental group teachers how to conduct teaching experiments in their experimental classes.

(2) Experimental implementation of teaching quality management

In this phase, the experimental implementation of teaching quality management was mainly carried out with the main axis of "results-oriented evaluation and guidance", in which the teaching quality management department gave advice to the teachers in the experimental group, and the teachers carried out their actions under the influence of the management strategies. The researcher observes the work of the teachers in the experimental group and conducts classroom observations in the experimental classes. The experimental process involved teachers implementing teaching experiments with students, and the researcher followed up with guidance, listened to classes, conducted classroom observations, took notes, and collected data and relevant information. Teachers were also instructed to conduct classroom observations and record comparisons between the experimental and control classes, and to reflect on and summarize the teaching of the experimental class. The researcher (administrator) reflected and summarized the implementation of management strategies in a timely manner. The researcher (administrator) and the teachers of the experimental group met once a week during the implementation of the teaching experiment. The researcher (administrator) and the teachers of the experimental group met once a week

during the period of the teaching experiment. Teachers were instructed on how to conduct teaching experiments for the experimental group, not to use the relevant strategies for the control group, to control the experimental interferences, to ensure that the experimental group and the control group, which were divided by the teachers, conducted the teaching experiments under strict monitoring, and to ensure that the teachers' teaching experiments were real and effective.
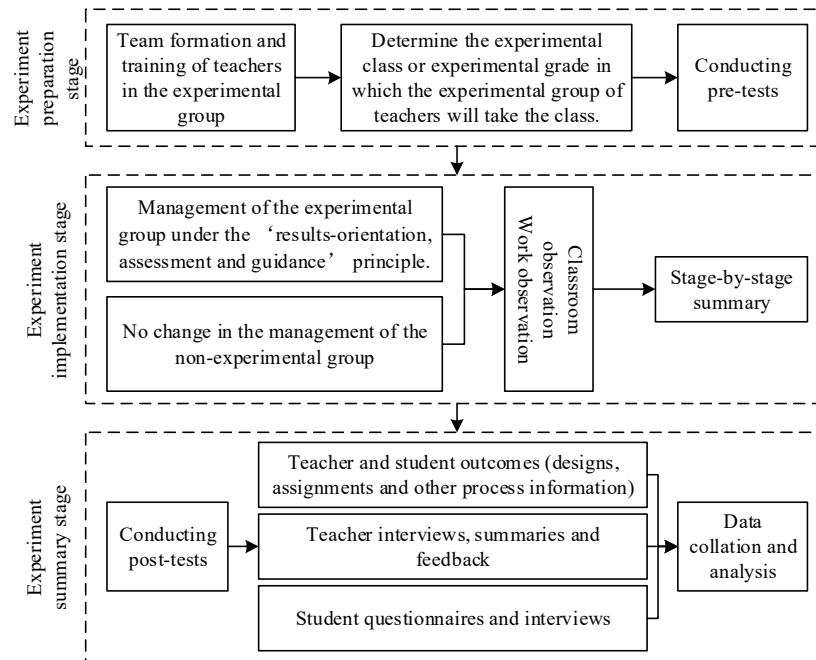

Figure 4: The process of English teaching design

(3) Data analysis and summarization

Post-tests and interviews were conducted with the experimental subjects to summarize and analyze all the data and information collected in the course of the study, and to write relevant conclusion reports. The post-test sub-section of the management experiment of this study, used to test the teaching effect of the students' academic quality testing, is still taken as the post-test data of the end-of-term unified test or sampling questionnaire and results of the elementary school's region. In order to analyze the effect of teaching English in elementary school with the support of English children's literature, and to clarify the pedagogical impact of English children's literature in teaching English in elementary school.

IV. B. The Effectiveness of Integrating Children's Literature into English Teaching and Learning

IV. B. 1) Changes in students' performance in English

After a semester-long English teaching experiment, the data were analyzed for the specific role of integrating English children's literature into English teaching. Students' English writing scores in different teaching modes were tested to analyze the changes in English writing scores of different groups of students before and after the experiment. The data of the pre- and post-tests were entered into SPSS software for statistics, and the differences in students' pre- and post-test writing scores were obtained as shown in Table 1.

As can be seen from the table, there is no significant difference between the English writing scores of students in the experimental class and the control class before the beginning of the teaching experiment (P>0.05), which has a greater role in reflecting the effectiveness of the teaching experiment. At the end of the teaching experiment, the English writing scores of the students in the experimental class increased from 62.18±5.87 to 81.64±3.76, and the overall writing scores increased by 19.46, while the English writing scores of the students in the control class increased by only 2.49. And there is a significant difference between the English writing scores of the students in the experimental class compared to the preexperiment (t=8.514, P=0.000<0.05), while there is no significant difference between the English writing scores of the students in the control class (t=0.685, P=0.279>0.05). The results show that the students' English writing level has improved to a significant degree, and it is the overall level that is improving, which indicates that the integration of English children's literature into elementary school English education is feasible and has a positive effect on the students' English writing ability.

Table 1: The difference in students' writing scores before and after the test

Class	Test	Score	t	P
EC	Before	62.18±5.87	8.514	0.000
EC	After	81.64±3.76	8.514	0.000
CC	Before	62.27±6.81	0.685	0.279
CC	After	64.76±5.94	0.685	0.279

In addition, this paper provides statistics on the total number of words (W), T-unit length (W/T), and clause length (W/C) of the essays of the students' pre and post-test English as in the two classes, and examines the changes in the students' English composition fluency before and after the experiment by using the paired-samples t-test. Table 2 shows the pre- and post-test composition fluency indicators of the two groups of students.

As can be seen from the table, at the end of the teaching experiment, there is no significant difference (Sig. > 0.05) between the composition fluency of students in the control class in terms of the total number of words in the essay (W), the length of T-units (W/T), and the length of clauses (W/C). As for the students in the experimental class, after the introduction of English children's literature for English language teaching, there was a significant increase in the total number of words in the writing text (P=0.002<0.05).There was a significant increase in the length of T-units (W/T) and the length of clauses (W/C), and the significance of these two indexes through the paired samples t-test was 0.000 and 0.003, respectively, which were lower than the 0.05 significant value. This indicates that after effectively selecting English children's literature for teaching English education, students' English writing fluency is effectively improved, reflecting that students have more content to write and are willing to write.

Table 2: The fluency index of students' pre and post-tests for composition

EC	W		W/T		W/C	
	Means	STD	Means	STD	Means	STD
Pre-test	98.54	38.72	8.27	2.69	7.24	1.25
Post-test	132.85	34.16	11.95	1.84	8.06	1.64
Sig.	0.002		0.000		0.003	
CC	W		W/T		W/C	
	Means	STD	Means	STD	Means	STD
Pre-test	98.63	29.63	8.33	2.84	7.18	1.29
Post-test	100.49	28.76	8.42	2.76	7.35	1.34
Sig.	0.287		0.335		0.316	

IV. B. 2) English Learning Interest Statistics

Before the beginning of the experiment, a questionnaire was administered to the experimental class to find out the English learning interests of the students in the experimental class (English Learning Interest, Vocabulary Learning Interest, Reading Learning Interest and Participation Motivation, which were defined as EL1~EL4). A total of 40 questionnaires were distributed and 40 were recovered, and the effective recovery rate of the questionnaires was 100%. At the end of the experiment, the questionnaire survey on English learning interest was conducted again for the experimental class to find out whether there was a shift in the English learning interest of the students in the experimental class. The questionnaire was distributed 40 copies and 40 copies were recovered. After collecting the data, SPSS data analysis software was used to reverse score the data of before and after questionnaires successively and calculate the variables, and then each dimension mean was subjected to paired-sample t-test. Table 3 shows the statistical results of the pre- and post questionnaire data of English learning interest of the students in the experimental class.

From the data in the table, it can be seen that the mean value of the students' interest in learning English in the pre-questionnaire was 2.15 points, and its mean value in the questionnaire after the end of the teaching experiment rose to 3.28 points, and the Sig. (two-sided) value of the paired-samples t-test was 0.001<0.05, so there is a significant difference between the data in the pre- and post-questionnaire. It indicates that the English learning interest of the students in the experimental class has been significantly changed at the end of the experiment. The mean values of Vocabulary Learning Interest, Reading Learning Interest and Classroom Participation Motivation in the post-experimental class questionnaire are higher than the mean values of the pre-questionnaire, and the Sig. (bi-lateral) values of Vocabulary Learning Interest, Reading Learning Interest and Classroom Participation Motivation are less than 0.05. It shows that students' vocabulary learning interest, reading learning interest, and classroom participation motivation were significantly improved after the experimental class was taught English with

the integration of English children's literature.

Table 3: Statistics of Interest in English Learning

Index	Test	M±SD	Mean difference	95% CI		t	Sig. (2-tailed)
				Lower	Upper		
EL1	Before	2.15±1.05	-1.13	-0.875	-0.612	-9.615	0.001
	After	3.28±1.21					
EL2	Before	2.81±1.37	-0.85	-0.352	-0.176	-8.736	0.000
	After	3.66±1.08					
EL3	Before	2.52±1.14	-1.44	-0.987	-0.853	-9.369	0.002
	After	3.96±1.27					
EL4	Before	2.08±0.95	1.31	-0.926	-0.724	-5.231	0.005
	After	3.39±1.06					

V. Conclusion

In this study, the distribution of themes in English children's literature was deeply mined through the LDA theme model, and its application effect in elementary school English education was verified through teaching experiments. It is found that the themes of English children's literature can be categorized into four major categories: love, romance, growth and pursuit, and the differentiation between themes is significant when the perplexity curve reaches its lowest point at K value 4. The results of the teaching experiment show that English teaching incorporating English children's literature can significantly improve students' English writing ability, with the T-unit length of the students in the experimental class increasing from 8.27 to 11.95, and the clause length from 7.24 to 8.06, and both of them are statistically significant (p<0.05); whereas the changes in the control class in these two indexes are not significant (p>0.05). Meanwhile, the experimental class students' interest in English learning was significantly improved, in which the mean value of vocabulary learning interest increased from 2.81 to 3.66, the mean value of reading learning interest increased from 2.52 to 3.96, and the mean value of classroom participation positivity increased from 2.08 to 3.39.These results indicate that the thematic distribution of English children's literature mined based on statistical modeling provides educational content selection with a Scientific basis, targeted integration of English children's literature into elementary school English teaching can effectively improve students' English writing ability and learning interest. This study not only enriches the theoretical system of English children's literature research, but also provides practical guidance for the optimal design of English education content in elementary school, which is of great significance for improving the quality of English education in elementary school.

References

[1]   Kizi, M. S. M. (2024). HISTORY AND DEVELOPMENT OF ENGLISH CHILDREN'S LITERATURE. Eurasian Journal of Academic Research, 4(4-2), 53-60.

[2]   Kumari, P., & Khan, S. (2019). LEARNING EFL IN INDIA BY MEANS OF ENGLISH CHILDREN'S LITERATURE. INNOVATIVE RESEARCH ON ENGINEERING, SCIENCE, PHARMACY, HUMANITIES AND MANAGEMENT (ICIR-2019), 59.

[3]   Wang, Y. (2017). A Bridge to Intercultural Understanding: Reading Teachers in the US & English Learners in China Read Children's Literature Books in a Global Book Club. Multicultural Education, 25(1), 41-47.

[4]   Foti, P. (2022). CULTIVATING LITERACY SKILLS THROUGH CHILDREN'S LITERATURE IN EARLY YEARS-THEORETICAL AND PRACTICAL ASSUMPTIONS. European Journal of Education Studies, 9(7).

[5]   Aisyah, M. M., & Mustofa, A. (2023). Children Literature as A Medium to Forter Critical Thinking: A Systematic Review on Benefit. Vivid: Journal of Language and Literature, 12(2), 191-196.

[6]   Askarbekovna, M. S. (2024). THE ROLE OF CHILDREN'S LITERATURE IN ENRICHING CREATIVE IMAGINATION. The latest pedagogical and psychological innovations in education, 1(2), 31-33.

[7]   Barton, G., Baguley, M., Kerby, M., & MacDonald, A. (2019). Exploring how quality children's literature can enhance compassion and empathy in the classroom context. Compassion and empathy in educational contexts, 165-188.

[8]   Kovalenko, R. O. (2022). MULTIMODAL MEANS OF EMBODYING EMOTIONAL CONCEPTS IN MODERN ENGLISH CHILDREN'S LITERATURE. INSTITUTUM PHILOLOGIAE, 46.

[9]   Riquelme, E., & Munita, F. (2018). Mediated Reading of Children's Literature as Paradigmatic Scenario to Develop Emotional Competence1. Psicologia: Teoria e Pesquisa, 33.

[10]   Morton, T., & Akram, S. (2022). Capturing Social-Emotional Learning (SEL) through Children's Literature. English in Texas, 52(1), 13-19.

[11]   Junaid, S. (2017). Children's literature in empowering children character building. Elite: English and Literature Journal, 4(1), 109-125.

[12]   Muzaki, F. I. (2024). Exposing narratives in 21st century children's literature for holistic development and education in strengthening character education for elementary school students. Journal of Language and Linguistics in Society, 4(2), 1-9.

[13]   Wang, C., & Goldberg, T. S. (2017). Using children's literature to decrease moral disengagement and victimization among elementary school students. Psychology in the Schools, 54(9), 918-931.

[14] Salih, R. S. (2023). The Importance of Ideology in Shaping Children's Cultural Values through Literature. International Journal of English Literature and Social Sciences, 8(6), 267-271.

[15] Wang, Y. (2023). Analysis of the Methods for Selecting Children's English Materials. Lecture Notes in Education Psychology and Public Media, 19, 215-220.

[16] Sharp, L. A., Diego-Medrano, E., & Coneway, B. (2018). What's the story with children's literature? A content analysis of children's literature courses for preservice elementary teachers. Reading Horizons: A Journal of Literacy and Language Arts, 57(2), 2.

[17] Chen, X. X., & Chen, W. H. (2025). Core Themes and Emerging Trends in International Children's Literature Research: A Bibliometric Analysis. Children's Literature in Education, 1-19.

[18] Fernández Fuertes Raquel,Gómez Garzarán Eduardo,Mujcinovic Sonja & Mañas Navarrete Iban. (2022). When teaching works and time helps: Noun modification in L2 English school children. Open Linguistics,8(1),475-495.

[19] Ramona T. Pittman,Rebekah E. Piper,Whitney McCoy & Melody Alanis. (2024). African American Language in Children's Literature. Journal of Literacy Research,56(2),157-183.

[20] William Appaw,John Lewis Zinia Zaukuu,Balkis Aouadi,Eric Tetteh Mensah,Ibok Nsa Oduro & Zoltan Kovacs. (2025). Predicting aflatoxin contamination in white and yellow maize using Vis/NIR spectroscopy combined with PCA-LDA and PLSR models through aquaphotomics approaches. Applied Food Research,5(1),100841-100841.

[21] Liu Yun. (2025). Model Framework for Discovering and Utilizing Public Opinion Hot Topic Knowledge in the Social Media Network Environment. International Journal of Intelligent Information Technologies (IJIIT),21(1),1-25.