

Research on Strategies for Optimizing Mind Map Resources in College English Courses from the Perspective of Deep Seek

Yu Gong

School of Foreign Language, Yangtze Normal University, Chongqing, China

Abstract: As a groundbreaking artificial intelligence tool, DeepSeek has officially inaugurated the post-ChatGPT era, profoundly impacting industrial technological development, social efficiency enhancement, and knowledge acquisition paradigms. Meanwhile, with deepening globalization, the significance of college English education has become increasingly prominent. However, traditional pedagogical approaches face multiple challenges due to disruptive digital innovations. The emergence of DeepSeek not only presents opportunities to transcend resource limitations and overcome the monotony of conventional English teaching methods but also provokes new reflections on educational reform in the context of AI. This paper examines the integration of mind-mapping resources within the DeepSeek framework, aiming to promote high-quality development and comprehensive innovation in college English curricula anchored in mind-map resources.

Keywords: DeepSeek; College English Curriculum; Mind Map; Resource Optimization; Strategic Research

1. Introduction

In the development of artificial intelligence, ChatGPT, as a milestone of Artificial General Intelligence (AGI), has propelled the application of generative large models across various social domains. However, OpenAI is not purely "open," as its closed-source foundation has facilitated technological hegemony that fuels "digital land grabs" [1]. The emergence of DeepSeek in 2024 has fundamentally disrupted the "digital monopoly"[2] of Western nations, exerting profound impacts on all aspects of social life. Meanwhile, university education, serving as a crucial component in social development,

bears the responsibility of cultivating talents to serve and advance society. Confronted with the fundamental transformation of digital civilization, the era of digital empowerment compels universities to initiate new rounds of teaching reforms tailored to their specific contexts. Against this backdrop, this paper attempts to utilize DeepSeek for optimizing and integrating mind-map resources, thereby further realizing the value and role of mind-mapping in college English teaching. During this era of continuous AI iteration, it aims to promote the deep integration of college English pedagogy with artificial intelligence.

1.1 Overview of DeepSeek

DeepSeek is a Chinese technology company dedicated to achieving Artificial General Intelligence (AGI). It was founded in 2023. Starting from the release of the DeepSeek Large Language Model (LLM) on January 5, 2024, by December 26, 2024, the performance of DeepSeek-V3 in knowledge-based tasks had significantly improved. The chatbot DeepSeek-R1, launched in January 2025, once surpassed ChatGPT to become the most downloaded free app in the iOS App Store in the United States [3]. On February 7, 2025, Zhou Hongyi, the founder of 360 Group, mentioned in an interview with "Economic Observer" that: "DeepSeek has demonstrated two key advantages. Firstly, it has brought about a technological revolution in reasoning cognition, enabling AI to evolve from mere mimicry to autonomous thinking. Secondly, its reinforcement learning strategy has reduced ineffective training of large AI models by 60% and lowered the demand for high-intensity computational power by 40% [4]." In summary, within the context of large language models, mind map resources in college English courses can be optimized and integrated, providing diverse design ideas for mind maps in the future, fostering a multi-modal mind map

experience, promoting deeper knowledge formation among students, and enhancing their language production capabilities.

1.2 Schema Theory and Mind Maps

Cognitive psychology posits that learners can further enhance their memory when connecting new knowledge with old. Meanwhile, schema theory suggests that embedding new information into existing schema is more conducive to students' understanding and learning. For instance, language learners, at the initial or advanced stages of language learning, can draw upon prior learning experiences or already acquired language structures to comprehend new languages or linguistic knowledge. Conversely, if learners possess flawed schema when acquiring new knowledge, they may encounter obstacles in learning this new information [5]. Under the influence of schema theory, mind maps have emerged as a graphical teaching tool. They effectively connect learners' existing experiences or previously learned knowledge by utilizing graphics, helping learners to link fragmented and vague knowledge from earlier studies and improve their memory. Additionally, mind maps cultivate learners' divergent thinking, clarify the logical connections between old and new knowledge, facilitate the integration of knowledge structures, and explore the visualization of learners' thought processes, ultimately aiming to refine knowledge structures and master knowledge content.

2 Analysis of the Current Status of Mind Map Resources in College English Courses

Currently, foreign language learning is being impacted by factors such as artificial intelligence, leading to a continuous weakening of its functional language aspects. The path to achieving communication through self-directed language skill acquisition is becoming increasingly narrow. College English, as a major foreign language public course in universities, has been at the forefront of discussions. During this period of transition, continuous teaching reforms in foreign language disciplines are being pursued to adapt to new trends and developments. On the one hand, as a teaching method in educational activities, the mind map format, with its unique lines, colors, and concise statements,

presents complex knowledge systems in a simplified and intuitive manner, gradually becoming the preferred teaching tool for college English educators. Educators often expect to use mind maps to enhance teaching quality within limited teaching time [6]. On the other hand, due to limitations in factors such as the effectiveness of supporting textbook resources, the diversity of resources on online platforms, the frequency of teacher resource utilization, and the frequency of student resource utilization, mind maps cannot fully play their role in guiding students' autonomous thinking and inquiry in daily teaching activities. Consequently, their advantages in promoting students' cognitive development are still insufficient.

2.1 Analysis of Current Issues in Supporting Textbook Resources

In analyzing the current issues with supporting textbook resources, the primary concerns revolve around the resources available in the mainstream textbooks already in use by both teachers and students. On the one hand, in College English courses, there is a significant lack of supporting textbook resources dedicated to mind map modules. Taking the mainstream textbook Innovative College English Integrated Coursebook, which I used in my teaching, as an example, the introduction to teaching resources in the preface of the textbook does not mention any mind map modules. If mind maps are needed, teachers have to create them independently. Regarding the content structure of the textbook, from the introductory section to the final writing tasks that students need to complete, the learning or practice materials primarily focus on "language focus." Although the post-class exercise types are diverse, they lack dynamism, flexibility, and interestingness. In summary, the relatively traditional and singular content provided by the textbook itself inadvertently restricts teachers when creating mind maps, affecting their quality and limiting their ability to meet the demands of diversified teaching models.

On the other hand, there is a significant disparity in the distribution of mind map resources across the listening, speaking, reading, writing, and translation modules in College English courses. When conducting a literature search in the CNKI database [7] over

the past three years using the keywords "mind map resources" and "English teaching," I retrieved a total of 2 journal articles, 6 master's theses, and 2 conference papers. The primary research directions were concentrated in the reading and writing modules, with very few mind map resources available for the listening and speaking modules.^[8] Consequently, it is relatively challenging to utilize mind maps to help students construct a comprehensive knowledge system and master skills in listening and speaking.

2.2 Analysis of Current Issues in Online Platform Resources

To continuously facilitate students' development of linguistic thinking activities, some teachers still employ mind maps in their regular teaching. Consequently, to overcome the limitations of mind map resources in textbooks, teachers also refer to supporting platforms or certain websites when collecting mind map resources. However, online platform resources also present certain challenges regarding "resource quality."

Firstly, there is an issue of resource compatibility. Online platforms offer learners a vast amount of resources, but it is difficult to precisely match these resources to the specific needs of teachers, or the content of the resources may be questionable. Subsequent screening and filtering processes require a significant amount of time, reducing the efficiency of mind map creation.

Secondly, there is a problem of resource timeliness. When reviewing the mainstream textbooks currently used in the College English courses at my institution, I found that only New Horizon College English provides mind map resources extended from the "U Campus Smart Cloud Platform." However, these resources are mostly based on textbook content and expand upon it, with limited breadth and depth. The updates on cutting-edge information are not timely, which is not conducive to meeting students' personalized needs.

Lastly, there is an issue of resource effectiveness evaluation. Most resources are teacher-made mind maps, often sourced from well-known websites or other self-media channels (such as Bilibili and Xiaohongshu). These resources do not evaluate students' learning outcomes after using mind maps,

making it impossible to determine whether students have achieved the learning effect of "drawing inferences from one instance."

2.3 Analysis of Current Teacher Usage

Although mind maps emerged in the 1960s, creating a high-quality mind map poses significant challenges for non-professional educators due to the need to base them on images and to construct corresponding hierarchical diagrams. These diagrams require the use of different colors, images, and text to facilitate memory reconstruction through interlinking, thereby forming a framework that integrates new and existing knowledge and enhances learners' memory and understanding of the material.^[9] Consequently, the process of mind map creation demands considerable effort and learning, particularly in the initial stages of resource integration and processing, which may dampen teachers' enthusiasm for using mind maps and reduce their lesson preparation efficiency, ultimately hindering their willingness to employ this tool. As a result, during instruction, most teachers still prefer traditional teaching methods, such as explaining content chapter by chapter or in the order presented in the textbook, rather than utilizing mind maps.

Taking Yangtze Normal University as an example, over the past three years, there were eight full-time teachers in the College English (I) and (II) (public courses) programs for the arts, physical education, and vocational education tracks. Through in-depth interviews with all the teachers, I collected data on their usage of mind maps. The statistics on usage frequency are as follows: no teachers used mind maps 1-3 times per week; three teachers (37.5%) used them 1-3 times per month; four teachers (50%) used them 1-3 times per semester; and one teacher (12.5%) never used them. On the other hand, when discussing the reasons for their reluctance to use mind maps with the interviewees, the main issues raised included: a lack of relevant software skills training, resulting in insufficient proficiency in using the software; the cumbersome process of creating high-quality mind maps; the scattered nature of resources to be integrated, leading to time-consuming organization; and difficulties in controlling classroom presentations, as students often struggled with "over-expansion but lack of consolidation" in their knowledge

acquisition after using mind maps to establish links.

2.4 Analysis of the Current Situation of Students' Usage

When mind maps are applied to students' autonomous learning, the overall usage rate is relatively low, mainly manifested in the following aspects: First, the correlation with the choice of learning software. During autonomous learning, students frequently use auxiliary tools. In the case of college English courses, due to the instrumental and functional nature of the language, students seldom employ mind maps for previewing, reviewing, and summarizing knowledge. Instead, they predominantly use translation software or corresponding video software. Second, the correlation with individual academic performance. High-achieving students tend to adopt various learning methods to improve learning efficiency and academic performance, showing a stronger willingness to search for mind map resources and create high-quality mind maps. In contrast, students with lower academic performance often have relatively monotonous learning approaches and are reluctant to experiment with more complex

learning methods, resulting in a weaker inclination to use mind maps. Third, the correlation with students' major fields of study. The impact of students' majors on the use of mind map resources is significant. Students in science and engineering majors, due to the nature of their disciplines, are more adept at mastering the methods of collecting mind map resources and the process of creating them compared to those in liberal arts and arts/sports majors. Consequently, they also exhibit a stronger willingness to use mind maps.

Taking Yangtze Normal University as an example: In the past three years, among the students in 9 arts/sports-related vocational majors from 6 Schools of the college what took English (I) and (II) (public courses) taught by the author, the survey data on their proactive use of mind maps for previewing and reviewing, based on usage cycles (i.e., using a mind map at least once within a cycle is counted as statistical data), is as followed in the table1: (**Note:** The actual table data is not provided in the Chinese text, so the English translation does not include specific data but retains the structure for potential future inclusion.)

Table 1. Use of Mind Maps by First - Year Students in Some Majors at Yangtze Normal University during the 2022 - 2024 Academic Years

School	Number of Students	Weekly Usage Percentage	Fortnightly Usage Percentage	Monthly Usage Percentage	Semester Usage Percentage	Never Used Percentage
School of Music	121 Students	11 Students\9.10%	9 Students\7.43%	24 Students\19.83%	65Students\53.72%	12 Students\9.92%
Academy of Fine Art	154 Students	17 Students\11.04%	11 Students\7.14%	32 Students\20.78%	62 Students\40.26%	32 Students\20.78%
School pf physical Education and Health Science	125 Students	4 Students\3.20%	9 Students\7.20%	31 Students\24.80%	54 Students\43.20%	27 Students\21.60%
School of Communication	186 Students	25Students\13.44%	21 Students\11.29%	69 Students\37.10%	57 Students\30.65%	14 Students\7.52%
School of Electronic Information Engineering	34 Students	7 Students\20.58%	5 Students\14.71%	10 Students\29.41%	6 Students\17.65%	6 Students\17.65%
School of Management	23 Students	5 Students\21.74%	3 Students\13.03%	7 Students\30.43%	4 Students\17.40%	4 Students\17.40%
AVERAGE		13.81%	10.13%	27.06%	33.81%	15.81%

As shown in the table1, it can be observed that in our school, both the School of Electronic Information Engineering and the School of Management achieved a weekly usage rate of mind maps exceeding 20%, whereas the usage rates in all arts and sports-related schools (i.e., art-oriented schools) were below 15%. Notably, the percentage of students in the Academy of Fine Arts and the School of

Physical Education and Health Science who had never used mind maps was as high as 20%. These data indicate an extremely poor situation regarding students' use of mind maps. As for the mind map resources, which form the foundation for creating mind maps, there is still substantial room for optimization and integration.

3 Research on the Optimization of Mind Map Resources Integrated with DeepSeek

In the context of the digital era, artificial intelligence (AI) technology is being applied in various aspects of the education field. While DeepSeek, as an intelligent language tool, poses challenges to college English teaching, it also brings new opportunities, enabling innovative reforms in various teaching links. As the "source" of high-quality teaching, teaching resources should and must incorporate AI technology. On the other hand, as an important teaching tool, mind maps rely on their corresponding resources as the key to effectively utilizing this tool. Therefore, empowering mind map resources for college English courses with DeepSeek can optimize issues related to resource classification, resource collection, resource integration, and resource sharing. This offers new teaching possibilities for college English courses, and lays a solid foundation for further innovating teaching methods, improving teaching effectiveness, and meeting students' personalized needs.

3.1 Optimization Strategies for Mind Map Resources Supporting Textbooks under the Empowerment of DeepSeek

3.1.1 Dynamic mind map generation strategy under the Empowerment of DeepSeek

By leveraging the large DeepSeek model to analyze college English textbook texts, core concepts, knowledge point association networks, and hierarchical relationships can be extracted to automatically generate a preliminary mind map framework. Teachers can first input the unit topic into DeepSeek, which will then generate core vocabulary, grammar keys difficult points, etc., centered around the topic. Teachers can select knowledge content suitable for in-depth learning by students, thereby overcoming the initial challenges of resource collection difficulties and limitations faced when teachers create mind maps manually. This approach facilitates the transition from static resources to dynamic resources and from two-dimensional (flat) resources to three-dimensional (layered) resources.

3.1.2 Multi-modal mind map integration strategy under the Empowerment of DeepSeek
By utilizing the Multi-modal of DeepSeek capabilities, it can integrate and process

videos and audio to facilitate the formation of a systematic and logically interconnected knowledge system. Teachers can link the video and audio resources already provided in college English textbooks to the completed basic mind maps, enabling seamless integration of videos and audio within the mind map interface. This approach can enhance classroom interaction, break away from traditional heuristic teaching methods, and realize digital empowerment in college English curriculum teaching.

3.2 Optimization Strategies for Mind Map Resources on Online Platforms under the Empowerment of DeepSeek

3.2.1 API interaction strategy under the Empowerment of DeepSeek

The primary function of APIs is to connect previously disparate programs or integrate multiple different systems through APIs, forming a larger system.¹ If this "bridge" or "intermediary" is absent between systems, interaction or communication cannot be achieved. As illustrated in the diagram:

In online platforms, the vast amount of resource data provides rich materials for creating mind maps for college English courses. Meanwhile, by utilizing the interaction between the open-source model of DeepSeek and APIs, intelligent integration of data and resources can be achieved, enabling the embedding of real-time, up-to-date learning resources into mind maps. Furthermore, leveraging APIs to access the recommendation of DeepSeek algorithms can also enable precise re-filtering of mind maps and network resources, simplifying the tedious steps involved in mind map creation and enhancing the effectiveness of the mind maps themselves.

3.2.2 Diversified mind map generation strategy under the Empowerment of DeepSeek
As mentioned earlier, through the continuous updating and precise filtering of resources on online platforms by DeepSeek, relevant knowledge clusters from different sources and domains can be integrated into mind maps, further enriching the dimensionality of resource content. This approach enables the knowledge structure covered in college English courses to develop in a more in-depth manner, breaking away from a singular, monotonous, and rigid English knowledge

system. It generates diversified mind maps to align with different types of teaching methods, enhancing the frequency and quality of teacher-student engagement in teaching activities, and achieving the goal of meeting different teaching needs and student requirements.

3.3 Strategies for Enhancing Teachers' and Students' Digital Skills and Literacy under the Empowerment of DeepSeek

3.3.1 Intelligent mind map generation strategy under the Empowerment of DeepSeek

As previously discussed, there are numerous factors restricting the use of mind maps by teachers and students, with the most prominent issue being their lack of digital skills. DeepSeek, however, can effectively address these problems. Due to its powerful Natural Language Processing capabilities, the DeepSeek open-source model can assist in automatically generating and constructing a mind map template library. This library allows for the timely downloading or generation of mind maps tailored to overall or different skill modules within college English courses. Consequently, it reduces the need for manual intervention by teachers and students in mind map resource integration, enhances the quality of mind map resource optimization, and fundamentally simplifies the tedious steps involved in mind map creation and the learning duration of digital operations.

3.3.2 Strategies for enhancing teachers' digital skills and literacy under the Empowerment of DeepSeek

Firstly, schools should conduct irregular training sessions on basic DeepSeek operations for teachers, especially those in the liberal arts, to help them change their mindset and actively embrace the digital wave, thereby promoting their systematic mastery of usage methods. Secondly, teachers should be required to genuinely apply the relevant functions of DeepSeek in their daily English course mind map designs, and exemplary mind map schema and cases under the Empowerment of DeepSeek should be showcased at the secondary college level. Thirdly, by utilizing the display resources, schools should establish a high-quality English mind map resource library created with DeepSeek to achieve the sharing of superior resources, allowing different teachers

to contribute to the library's perfection and real-time updates. Finally, irregular academic seminars and peer exchanges should be organized with different colleges from other universities or various institutions to stay informed about the latest developments, promptly assess teachers' use of English course mind map resources under digital conditions, and drive further teaching innovations and reforms.

3.3.3 Strategies for enhancing students' digital skills and literacy under the Empowerment of DeepSeek

On the one hand, artificial intelligence courses related to DeepSeek can be introduced as general education courses, guided by professional teachers, focusing on the collection and creation of mind map resources under the Empowerment of DeepSeek. This will provide students with more opportunities for systematic learning and facilitate increased frequency of mind map usage in college English courses. On the other hand, collaborative editing activities for college English course mind map resources can be carried out between teachers and students. Under the Empowerment of DeepSeek, it is no longer a dream for students to participate in teachers' mind map resource integration. Through collaborative sharing and involvement in mind map compilation, students are more likely to change their attitudes toward college English course learning and develop innovative thinking abilities^[10].

4. Conclusion

DeepSeek, as a large language model, encompasses various aspects including information retrieval, natural language processing, machine learning, image and video processing, automation and intelligence, collaboration, and sharing, among others. Its role is not confined to a single dimension but rather enhances the efficiency of mind map resource utilization in college English courses from multiple perspectives, thereby improving the quality of mind maps and promoting the sharing and collaborative development of English knowledge system learning resources. When creating mind maps, it aids both teachers and students in developing critical and innovative thinking; facilitates students' visual learning and logical comprehension;

and assists teachers in integrating diverse information and generating high-quality mind maps. On the other hand, as a startup company focused on AGI, "DeepSeek Technology" has developed DeepSeek as a novel product, which is still undergoing continuous research and exploration. Consequently, the optimization strategies for college English mind map resources proposed in this paper inevitably have certain limitations, such as insufficient understanding of the application of the DeepSeek open-source model. The author looks forward to further exploring more suitable application models for mind map development needs under DeepSeek conditions in future research, to achieve digital empowerment to drive innovative reforms in college English curriculum teaching.

References

- [1]Ling Xiaoxiong. DeepSeek Ushers in the Post-ChatGPT Era: On Digital Paradigm Innovation and Its Operational Philosophy. Journal of Northwestern Polytechnical University (Social Sciences), Feb, 2025(2).
- [2]China's AI embraces open source and has a global impact. Global Times, 2025-02-14(014).
- [3]Huangpu Shijun. The emergence of DeepSeek has brought about some rethinking. Yinchuan Daily, 2025-02-13(05).
- [4]Zhang weijing. Create a "new paradigm of smart education" with DeepSeek as the engine. Tianjin Daily, 2025-03-03.
- [5]He Wen. Research on Application Strategies of Mind Mapping in College English Teaching. Journal of Jiamusi Vocational institute, No. 10. 2023 Sum 251.
- [6]Wu Yanping, Tang Guochun. An Analysis on the Application of Mind Mapping in College English Teaching. Journal of Higher Education, 2022(11).
- [7]Yang Fang. The application of mind mapping in college English reading teaching. English Square, Apr, 2024(264).
- [8]Shao yijing. Research on the Application of Mind Mapping in College English Oral Teaching. English Square, Sep, 2024(278).
- [9]Wang Jingqi, Dang Ji, Cui Yujie. The Integration and Development of Artificial Intelligence and College English Teaching in the Perspective of Educational Informatization. Learning Weekly, Jan. 2025 Vol.1.
- [10]Xu Danli, Wang Binghan, New Paradigm of Digital Civilization: Ecological Construction of DeepSeek's Open-Source Innovation. Journal of United Front Science, 2025(2): 82-93.