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Enhancing Cumulative Knowledge-Building in English Education: Semantic Wave Theory in Blended Learning Contexts

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ABSTRACT
This thesis investigates the application of semantic wave theory (SWT) in blended learning to enhance cumulative knowledge-building in English education. A blended learning model is proposed, aiming to blend online and offline instruction, facilitating a gradual wave of knowledge accumulation. The study offers suggestions to bolster the ecosystem of blended English teaching, including refining the teaching structure, enhancing teachers' information technology competence, creating a comprehensive online teaching resource library, and constructing a sound evaluation mechanism.

KEYWORDS
semantic wave; cumulative knowledge-building; blended learning

The advent of blended learning has revolutionized the educational landscape, offering a dynamic fusion of traditional classroom instruction with digital learning platforms. This thesis explores the application of semantic wave theory (SWT) within the context of blended learning to enhance cumulative knowledge in English education. SWT, with its focus on the density and depth of semantic content, provides a theoretical framework for understanding how knowledge is built cumulatively and how it can be leveraged to improve language learning outcomes. The aim is to identify and evaluate strategies that facilitate the incremental construction of knowledge, aligning with the principles of SWT.

1 Theoretical Basis

1.1 Semantic wave

Originating from legitimation code theory, Maton (2013) introduced the semantic waves, which is driven by the utilization of codes that adhere to standards for the rational expression of meaning, serving to elaborate the underlying pattern of knowledge accumulation during the learning process. The semantic wave encompasses two codes: semantic density and semantic gravity: SG pertains to the degree of a semantics' dependence on its context: a higher semantic gravity (+) indicates greater contextual constraint on semantics, whereas a lower one (-) suggests otherwise. For instance, the semantic gravity associated with a specific historical event is typically greater than that of a general historical event, thus necessitating a comprehensive and objective analysis within the particular historical context in which it occurred. Conversely, semantic density relates to the concentration of semantics: a higher semantic density (+) signifies that a symbol encompasses more condensed meanings, whereas a lower one (-) entails less. For example, certain professional terms within specific fields, such as medicine or law, inherently possess a significantly higher semantic density compared to our everyday vocabulary. The process of knowledge building typically progresses from abstract concepts to concrete examples, and then reverses back to abstraction, resulting in peaks and bottoms that constitute a continuous cycle.

1.2 Cumulative knowledge-building

Maton (2013) associated semantic waves with cumulative knowledge building, arguing that this process entails learners transferring their acquired knowledge to subsequent learning based on prior understanding. In the context of teaching, teachers can utilize concrete examples and context to build understanding, unpacking highly abstract and technical concepts (SD ↓ SG ↑), and subsequently re-abstract concepts from these examples and contexts, repacking knowledge (SD ↑ SG ↓). Similarly, learners should employ "unpacking" and "repacking" to create semantic waves during their learning. Any absence of deduction or induction in this process disrupts the integrity of knowledge building, hindering learners' knowledge accumulation and ultimately leading to its failure.

2 Blended learning model

The innovation of teaching model is of utmost importance in enhancing teaching effectiveness. To foster deep integration between English teaching and information technology, and harness technological advantages to drive

effective blended learning, this study introduces a blended English learning model grounded in semantic wave theory. At its core, this model aims to seamlessly blend and complement online and offline instruction, jointly facilitating a seamless transition between the unpacking and repackaging of knowledge in teaching activities. Consequently, this creates a gradual wave of knowledge accumulation, realizing a continuous cycle in the teaching and learning process.

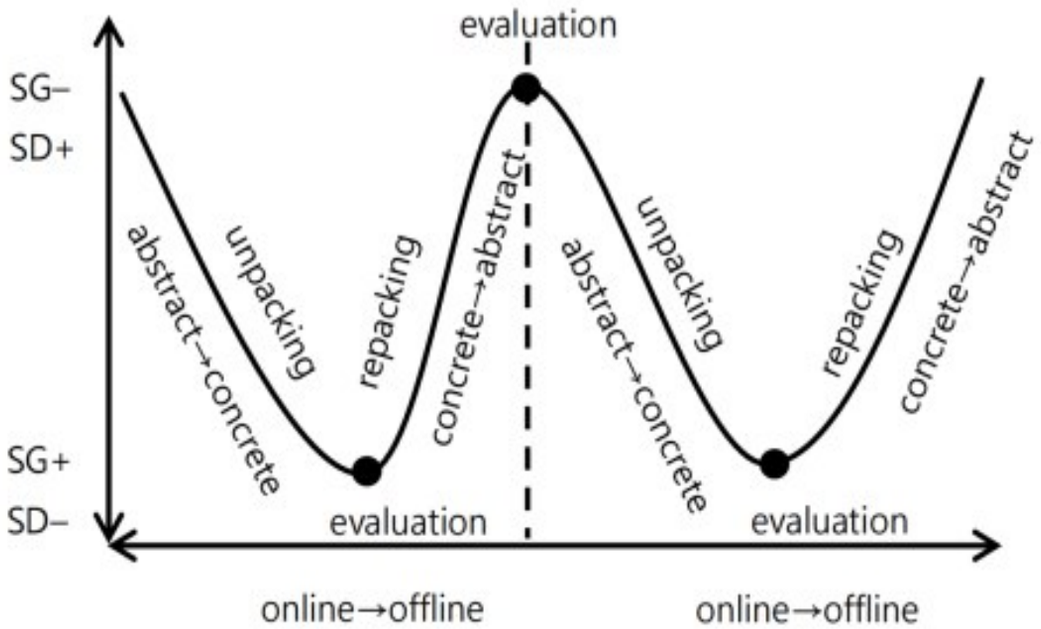

Figure 1 Blended learning model

Figure 1 vividly illustrates the blended learning model of English based on semantic wave theory. In the online segment, abstract English knowledge is unpacked by decreasing SD and increasing SG, transforming intricate concepts into tangible, situational content that students can readily comprehend and assimilate. During the trough phase of the semantic wave curve, evaluations are conducted to gauge students' understanding of unpacked knowledge, enabling flexible adjustments to the subsequent teaching pace.

Once students have initially established perceptual knowledge and a foundational grasp of the material, the offline classroom becomes the primary venue for deepening their studies and enhancing their critical thinking skills. Through organized reasoning, discussions, syntheses, and other speculative activities, students are guided to repackage knowledge, extracting core content with high SD and reduced SG. The seamless integration of online and offline instruction creates a dynamic semantic wave curve, effectively fostering students' internalization and application of knowledge, and achieving a comprehensive learning journey from perception, in-depth understanding, to advanced application.

The positioning of online and offline elements within the declining and rising stages of semantic waves is primarily due to the following considerations: Firstly, traditional foreign language teaching often focuses on dissecting, analyzing, and illustrating knowledge points, while paying less attention to refining, evaluating, and integrating them (Ma et al., 2021). By assigning the task of unpacking knowledge online, teachers can allocate more time and energy to engage in speculative offline teaching activities (Lee et al., 2017: 428), aligning with the flipped classroom teaching concept. Secondly, compared to online instruction, teachers' face-to-face offline teaching activities can more directly and efficiently address students' questions, foster teacher-student interaction, and achieve the intended teaching objectives. Consequently, offline teaching is better suited for tackling the more complex and challenging task of abstraction (Ma et al., 2021).

It is important to emphasize that to facilitate the formation and sustainment of the semantic wave, the construction of this teaching model necessitates specific requirements for the knowledge system, teaching resources, teaching activities, and supervision and evaluation. The knowledge system must be informative, logically coherent, hierarchically clear, and progressively built. The mining of teaching resources should facilitate the fluctuation process of semantic unpacking and repackaging. The organization of teaching activities should adhere to the student-centered, teacher-guided thinking paradigm. For supervision and evaluation, a diversified approach that combines process and outcome assessments, and integrates online and offline methods, is essential.

Notably, the successful implementation of this model hinges on a consensus and collaboration between teachers and students. Teachers should lead in setting goals, arranging content, designing activities, monitoring progress, and

evaluating outcomes. Together, teachers and students should promote the seamless integration and complementarity of online and offline teaching, fostering the cyclical transformation between knowledge unpacking and repackaging. Additionally, teachers should actively seek and deeply consider opinions and suggestions to promptly adjust and optimize the model.

3 Inspiration on Teaching and Learning

The cumulative knowledge building, which is intimately tied to the theory of semantic waves, offers invaluable guidance for both knowledge building and the incremental development of self-knowledge. Furthermore, it sheds light on English classroom teaching methodologies and strategies for English language learning.

In teaching, teachers should pay attention to the formation and development of semantic wave. Teachers should realize the ups and downs of semantic waves, that is, each semantic wave has peaks and bottoms, and grasp the important and difficult points in teaching. Recognize that the continuity of semantic wave is the uninterrupted process of knowledge accumulation, and strive to promote students' cumulative knowledge construction. Teachers should use semantic wave to improve teaching practice and teaching evaluation. When teaching, teachers should concretize abstract concepts in time and accurately, give examples and explanations in time, reduce semantic density, improve semantic gravity and reduce students' learning difficulty. In addition, when evaluating teaching, teachers can observe whether the process of students' knowledge construction is complete through semantic waves. Teachers should have three processes of "unpacking" and "repacking" in imparting knowledge. Some blended learning courses only focus on "unpacking", which only concentrate on explaining knowledge clearly, but ignore the importance of "repacking", leading to the failure of cumulative knowledge building. A good blended learning model should have both deduction and induction, which can not only explain information, but also refine information, thus promoting the development of students' cumulative knowledge building and thinking ability.

Furthermore, students should enhance their comprehension of SD and SG in their learning endeavors. They should develop the skill to recognize words and terms with high SD and low SG, and give these words and terms special attention to avoid obstacles in understanding the learning material. On one hand, students should consolidate their ability to elucidate words and terms by learning to express them in more detailed and specific manners, thereby reducing the SD of challenging vocabulary. On the other hand, they should also strengthen their capacity to generalize semantics by summarizing specific content with more concise expressions, decreasing SG, forming concepts, and facilitating memory retention. In their learning process, students should strive to promote semantic waves and facilitate the construction of cumulative knowledge. They should possess the mindset of both "unpacking" and "repacking" information, nurturing their abilities in induction and deduction, and cultivating good thinking habits. By consistently promoting semantic waves, students should also monitor whether the progress of their learning has achieved the intended objectives. Additionally, students should pay attention to the continuity of semantic waves to ensure that the learning process is seamless and builds upon past knowledge, thereby fostering cumulative construction.

4 Suggestion

The blended learning model based on semantic wave theory aims to achieve a balanced division and seamless integration of online and offline instructional content. However, upon reviewing traditional teaching practices, it becomes apparent that blended learning, to some extent, still merely transfers traditional classroom content onto an online platform. Many educators lack the independent thinking and innovation required to fully harness the potential of blended teaching, often relying solely on technical means to replicate the traditional classroom experience. To achieve effective integration of blended teaching, it is crucial to update teaching concepts and to thoughtfully apply theory and design principles in the process. In the future, we can enhance the ecosystem of blended English teaching in senior high schools by focusing on the following aspects:

To design a reasonable teaching structure within the framework of blended learning. As teachers, it is essential to recognize that the core objective remains fostering the accumulation and construction of students' knowledge. While the current emphasis on blended teaching often centers on the utilization of information technology, genuine educational reform necessitates a holistic approach that focuses on the innovation of teaching structures and systems, transcending mere technical media adoption. Prioritizing the transformation of the teaching focus from technical aspects to the design of teaching structures is paramount in blended teaching reform (Shi, 2019). Teachers must exercise their subjective initiative by deeply engaging with the teaching content and paying meticulous attention to the design of blended learning objectives, activities, and processes. This involves cultivating a dynamic, compatible, and effective learning environment that promotes student engagement and growth (Hu, 2021). Future efforts should focus on refining

the difficulty levels, logical arrangement, and progression of college foreign language proficiency goals (Ma et al., 2021). By integrating online and offline methodologies, blended learning leverages the convenience and resourcefulness of online platforms while addressing their limitations in deep interaction and practical application. This fusion ensures effective knowledge transfer and maximizes educational value, achieving a balanced and enriched learning experience.

To enhance teachers' information technology competence. While online English teaching fosters students' autonomous learning abilities, teachers remain integral to the entire autonomous learning process, including the selection of resources, dynamic monitoring, and evaluation (Wang, 2020). Hence, teachers must excel in teaching technology, teaching prowess, and teaching quality. On one hand, teachers should actively engage in training programs to refine their information technology skills, adeptly utilizing various online teaching tools to provide robust technical support for blended learning. On the other hand, they should seamlessly integrate advanced educational information technology into English classroom instruction, striving to create a diversified and interactive learning environment for students. This dual approach not only equips teachers with the necessary technological expertise but also ensures that the classroom remains a dynamic and engaging space for learning.

To create a comprehensive online teaching resource library. Although the novel forms and abundant curriculum resources of the single online teaching mode have attracted numerous learners, the effectiveness of online English learning still primarily focuses on the listening aspect, resulting in limited improvement in students' English skills. In light of this, teachers should consider the following aspects when preparing online resources: Firstly, meticulously screen and effectively integrate network resources based on the students' learning situation and the challenging content of the curriculum. This will help in creating a teaching resource library aligning with our educational philosophy and students' needs. Secondly, recognizing the absence of real-time teacher supervision in online teaching. When selecting or creating resources, teachers should adeptly incorporate challenging yet moderately difficult materials to ignite students' learning motivation. Furthermore, a strong emphasis should be placed on the interactive design of these resources to sustain students' interest in learning over time. Specifically, teachers can use cutting-edge technologies such as AI, VR, and AR to diversify online learning resources. Alternatively, they can opt for or develop micro-lesson resources equipped with interactive assessment features, enabling students to instantly evaluate their learning effectiveness. This will not only enrich the learning experience but also deepen their engagement in online English learning, ultimately enhancing the overall quality of education.

To construct a sound evaluation mechanism. English teaching evaluation should emphasize the learning objectives and competency requirements, comprehensively employing a variety of evaluation methods and tools to objectively and holistically assess students' learning outcomes. The evaluation subject should evolve from being singular to multiple, with teacher evaluation as the foundation. Additionally, student self-evaluation and peer evaluation should be scientifically designed and integrated to broaden and deepen the scope of evaluation. Furthermore, the evaluation content should transcend the mere examination of language knowledge to encompass a comprehensive assessment of multi-dimensional competencies such as listening, speaking, reading, writing, and translation, cross-cultural communication awareness, speculative innovation, and teamwork. An index system that is comprehensive, systematic, and targeted should be established to reflect these competencies. It should seamlessly integrate summative and formative evaluations, dynamically assessing students' ability development through methods such as learning process record analysis, classroom practice performance evaluation, project-based evaluation, and learning achievement displays. Attention should be given to the collection, analysis, and application of evaluation data, leveraging big data technology to track and analyze students' learning behaviors and progress trajectories. This data can be used to create a portrait of students' development, providing valuable insights for teaching reform and personalized instructional decisions.

5 Conclusion

Despite the widespread adoption of the blended learning in education filed, its effectiveness often falls prey to a superficial emphasis on form over substance. Blended learning, however, when informed by semantic wave theory, offers a powerful approach to enhancing cumulative knowledge in English education. By implementing strategic teaching methods, educators can create a learning environment that promotes deep understanding and long-term retention of language skills. This thesis has identified a range of suggestions that, when applied within a blended learning context, can lead to significant improvements in the way students build and apply their knowledge in English.

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