

EXPLORING THE IMPACT OF E-BOOKS ON ENGLISH VOCABULARY ACQUISITION  
IN PRESCHOOL CHILDREN: A COGNITIVE DEVELOPMENT PERSPECTIVE

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## Abstract

### EXPLORING THE IMPACT OF E-BOOKS ON ENGLISH VOCABULARY ACQUISITION IN PRESCHOOL CHILDREN: A COGNITIVE DEVELOPMENT PERSPECTIVE

Xiange Guan

Under the Supervision of Professor Lindsay Hollingsworth

E-books are now being used more and more widely in English language learning. There are still some doubts about the impact of e-books on Chinese preschoolers' English learning, especially vocabulary learning. Meanwhile, the quality of existing e-books varies, and educators and parents need some guidance in choosing appropriate e-books for preschoolers. This study examines the effects of e-books on English vocabulary acquisition and cognitive development of Chinese preschoolers. The study combines various language developmental ability during the critical period with the advantages of e-books, revealing that e-books significantly contribute to children's language and cognitive development. Through a comprehensive literature analysis, the study found that e-books enhance vocabulary acquisition and cognitive skills. In addition, this study provides educators and parents with guidance on choosing appropriate e-books for young children.

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## Chapter I Introduction

As digital educational tools are widely used, E-books are gradually becoming new educational tool for early childhood language learners. E-books books not only provide more convenient ways for English vocabulary acquisition but also stimulate children's interest and motivation to learn through rich multimedia features and interactive design. The widespread adoption of this tool has opened up new possibilities for early education and provided an opportunity to explore its application in language learning. This paper seeks to explore how e-books can promote language development, cognitive development, and vocabulary acquisition in English early childhood settings in China. In China, the age that English language is introduced to children is getting younger (Lü, 2021). Children as young as preschool students start to learn English. The fact that preschool children are beginning to learn English highlights the need for innovative and effective educational resources tailored to their developmental needs. Interactive e-books can facilitate English vocabulary acquisition for young children in China. However, many parents and teachers remain unaware of the effective role that interactive e-books have on English vocabulary acquisition.

The study is based on Piaget's theory of cognitive development (Piaget, 1962) which states cognitive development is a dynamic process. Individuals use schema, assimilation, accommodation, and equilibrium to build and change their thinking; therefore, achieving gradual development of their cognitive abilities. Language acquisition is essentially the continuous revision of schema, involving the dynamic interplay between assimilation and accommodation. E-books enhance language acquisition by supporting the continuous revision of mental schema through these processes. They facilitate assimilation by presenting new vocabulary in contexts like stories or real-life scenarios, helping learners connect new words to their existing

knowledge. Multimedia features such as audio, animations, and interactive exercises provide multi-sensory input to reinforce learning. For accommodation, they challenge learners' existing schema with complex concepts, prompting adjustments and offering cognitive support and real-time feedback to aid understanding. Overall, interactive e-books provide a dynamic learning environment that supports effective vocabulary acquisition.

According to Piaget, preschool children ages 3-6 are in the preoperational stage of thinking. In this stage, children start to use symbols, think only about themselves, believe that objects have feelings, and don't understand that some things stay the same even if they look different. They learn best through pictures and actions. Interactive e-books with animations, touch controls, and talking characters support preschool students in the preoperational stage and facilitate their learning.

The research also focuses on cognitive load theory (CLT; Sweller, 1988) which refers to the mental effort required to process and manage information in working memory. It involves the total capacity used to accomplish tasks, solve problems, or acquire new knowledge. Our ability to handle cognitive load is limited, and when it becomes too high, it can hinder learning and the construction of schema. Preschoolers are in the early stages of cognitive development and need to manage cognitive load to optimize learning experiences. Miller's (1956) "7±2" chunking theory suggests that the ideal amount of information our short-term memory can handle is around 7 (±2) chunks. This highlights the need to structure information into smaller, more manageable pieces to enhance understanding and memory. (Miller, 1956) Interactive e-books offer a unique opportunity to apply CLT principles in educational settings. Their multimedia features, such as animations, touch interactions, and voice feedback, can enhance learning by breaking down complex information into manageable chunks. (Miller, 1956) For

example, animations can visually demonstrate vocabulary usage, while interactive elements allow children to engage actively with the content. This design not only reduces extraneous cognitive load but also supports intrinsic cognitive processes, promoting better knowledge construction.

Finally, the research draws from Mayer's (2001) cognitive theory of multimedia learning which suggests that multimedia learning involves using both words and images to learn. It has been found that people learn more effectively when information is presented using both words and pictures, rather than just words. This type of learning is more accurately referred to as dual-mode, dual-format, dual-code, or dual-channel learning. CTML suggests that learning is most effective when information is presented in multiple modalities (e.g., visual and auditory.)

Interactive E-books represent multimedia learning tools that follow the principles of CTML. They incorporate text, images, animations, and interactive features to provide a rich experience for learners with multi-sensory engagement. According to Paivio's (1991) dual-coding theory, visual and auditory information are two independent yet complementary channels when processing information. When words are read or heard with visual illustrations or other non-verbal information, they are better understood and retained compared to when they are told or read using only a single channel. (Clark & Paivio, 1991). Therefore, for preschoolers, interactive e-books can facilitate vocabulary acquisition by presenting new vocabulary through vivid visual displays and auditory cues. This multimedia teaching method not only effectively reduces cognitive load, but also contributes to the formation of cognitive structures, which is important for the long-term memory of information.

Through a literature review, this paper will examine how e-books can incorporate children cognitive developmental characteristics to promote English language acquisition.

Specifically, it will assess the effects of e-books on children's English vocabulary acquisition, analyze the design features of e-books and their influence on the cognitive development of preschoolers, and provide a guide for teachers and parents in China to choose English e-books suitable for preschoolers. By examining how e-books can be aligned with children's cognitive developmental characteristics, this study seeks to provide valuable insights into the effective integration of digital tools in early childhood language education.

### **Statement of the Problem**

The study seeks to answer three important research questions:

1.How do developmentally appropriate e-books promote English vocabulary acquisition for young children in China?

2.How do e-books impact young children's cognitive development?

3.How do educators and parents choose suitable e-books books for preschoolers in China?

### **Definition of Terms**

1.Cognitive development

Cognitive development involves the growth and change of intellectual and psychological abilities (such as thinking, reasoning, and understanding), as well as the process of acquiring and consolidating knowledge. (Gizzonio et al., 2021)

2.E-book

E-books are a digital format that integrates the characteristics of traditional print books with interactive digital features. These features include audio narration, word pronunciation, text highlighting, text-to-speech, and gamification, all of which enhance the reader's experience.

(Dore et al., 2018). E-books are known by a variety of terms, including digital book, storybook, interactive book, animated book and reading apps. For the purposes of this paper, the term “e-books” will be used when referring to the above-mentioned terms. E-books, as an emerging reading tool, especially animated e-books, have been shown to significantly facilitate children’s vocabulary acquisition. Previous studies have shown superior vocabulary gains for interactive e-books compared with static versions of the same books (Silverman & Hines, 2009; Smeets et al., 2015).

### 3. vocabulary acquisition

Vocabulary acquisition is how learners gain new words by using different methods. It includes learning a word’s sound, spelling, meaning, how to use it, and where it fits in a sentence. Building vocabulary is key for speaking a language well, accurately, and effectively. There are two main ways to do this: intentional vocabulary learning, where you actively study new words using tools like lists or flashcards; and incidental vocabulary learning, where you pick up new words while reading, listening, or talking, using context to figure out what they mean (Nation, 2001).

### **Purpose of the Study**

The purpose of the study is to:

1. To assess the effect of e-books on children’s English vocabulary acquisition
2. To analyze the design features of e-books and their impact on the cognitive development of preschoolers
3. Provide guideline for teachers and parents in China to choose English e-books suitable for preschoolers

### **Significance of the Study**

The paper aims to study the impact of developmentally appropriate e-books on preschool children's English language acquisition in China. Nowadays, there are many digital learning tools, such as e-books and language learning software, which are not designed with children's cognitive developmental stages in mind. For example, children of different ages and developmental levels have varying levels of comprehension and attention. This leads to issues related to e-books not working well for children and failing to achieve their intended goals. This research paper will recommend characteristics of developmentally appropriate e-books to support preschooler's English language acquisition. The paper recommends adjusting the interactive complexity of learning tools to make the tools more suitable for preschool children. The guideline can help parents and teachers to choose appropriate resources to accelerate the English vocabulary development of preschool children in China. The paper also provides a set of criteria for both educators and parents to support them to choose more suitable digital language learning resources. In addition, it aims to help preschool children who are non-native English speakers to learn the language better. The study has practical implications for families with limited resources to optimize low-cost digital tools. In this way, more children can have access to high-quality educational resources and narrow the educational gap.

### **Delimitation of the Study**

This study investigates the impact of e-books on English vocabulary acquisition among preschool children aged 3 - 6 years in China. Focusing on this age group targets a critical period of rapid cognitive and linguistic development. The research examines the design features of interactive e-books and their short-term effects on cognitive development, specifically in the context of English vocabulary acquisition. Other language skills, such as grammar or phonology, are not addressed, and the study relies solely on library research, analyzing existing literature

rather than collecting empirical data. The research is geographically limited to China, reflecting the unique educational context and practices within the country. The core hypothesis is that interactive e-books can significantly enhance vocabulary acquisition, with research questions centered on their design features and cognitive impact. However, this study acknowledges limitations, including the absence of empirical data and a focus on short-term effects, which precludes exploration of long-term impacts.

### **Methodology**

This paper **will use** library research to explore the effects of e-books on preschoolers' English vocabulary acquisition from a cognitive developmental perspective.

### **Chapter II Review of Literature**

E-books, because of their multimedia function and interactive features, are an emerging educational resource used to support English language acquisition for preschool aged children in China. Since preschoolers are in a critical cognitive developmental period, more and more researchers have begun to focus on the role of e-books on preschooler's English vocabulary acquisition. This literature review will begin by describing the concept of critical period and then discuss interplay between language acquisition and cognitive development. Finally, the focus will shift to the impact of e-books on children's English vocabulary acquisition

including theoretical knowledge related to the multifunctional features of e-books. The paper will provide guidance for early childhood educators and parents to help them to support e-books and utilize e-books to promote preschooler's English vocabulary acquisition and cognitive development.

### **Preschool Period: A Critical Stage for Child Development**

The preschool period, defined as the ages of 3 to 6, is a critical time for rapid growth and significant developmental changes in children (Haddad et al., 2019). During this stage, children begin to acquire new skills across several fundamental areas, including social and emotional capabilities, as well as cognitive development. Cognitive development involves the growth and changes in intellectual and mental abilities, including thinking, reasoning, and understanding, as well as the processes of acquiring and consolidating knowledge. At this age, children start to learn skills such as asking questions, understanding spatial relationships, problem-solving, imitation, developing number sense, and engaging in symbolic play. These abilities are crucial for children's overall growth and development (Rueda et al., 2005; Thorell et al., 2009; Wass et al., 2011).

Language development is also an essential component of children's growth during this period. Ages 3 to 6 are a critical time for rapid language development, during which children's vocabulary expands rapidly, and they make significant progress in grammar, phonology, and pragmatics. Language, as an important cognitive tool, is closely related to children's abilities to think, reason, and understand. In fact, the principles of language development apply not only to the acquisition of a first language but also to the learning of a second language.

Moreover, the preschool period is a key time for the formation of reading habits. A survey (cited in Zhao, G. (2016) conducted by the China Children's Press and Publication Group among children aged 0 to 9 and their parents shows that the key stage for developing reading habits is before the age of 7. Educators and parents should pay special attention to this period because children who do not develop good reading habits before the age of 7 may face gaps in mastering and improving their reading skills later. According to the critical period theory proposed by Austrian zoologist Konrad Lorenz, early childhood is a period of significant

potential for development (Lorenz, 1935). If children miss these critical periods, their development in certain areas may not proceed as smoothly as expected.

### **Critical Period for Language Acquisition, Oral Language Development and Reading Foundational Skills**

Research indicates that the foundation for language acquisition, oral language development and reading foundational skills is established in young children during the critical period. Critical period for language acquisition, oral language development and reading foundations are discussed respectively below.

#### **Critical Period for Language Acquisition**

Nowadays there is a general agreement among Chinese educators and parents that the earlier the better to learn English. According to Lenneberg (1967), the best time for language learning is between the age of 2 to puberty. During the period, we have the unique advantage and the brain is just like a sponge that naturally acquire language, making the process of learning a foreign language more efficient and easier, and even reaching near-native levels. It is important to note that this critical period phenomenon does not only exist in the acquisition of the mother tongue, but also in the learning of a second language. The born language-learning advantage diminishes with age. Children between the ages of 3 and 6 are in the critical period of language learning. Although there is a lack of good English learning environments in China, e-books can give full play to its advantages of convenience and low cost of use, and with a large amount of input, children's language learning ability can be greatly improved.

#### **Critical Period for Oral Language Development**

3-6 years old is the period of oral language explosion, however we still face great challenges in realizing this goal of oral language development for Chinese young learners. China's Developmental Guidelines for 3–6-year-old state: Early childhood is an important period for language development, especially oral language development. This view is highly consistent with academics' research on the critical period of language. Lorenz (1935) stated the first critical period for children's oral language development is between the ages of 2 and 3, while the second English language development for children ages 4 and 5 during the critical period for learning language. Based on the accumulation of critical periods, children aged 3-6 years show an explosive increase in language. from 3- 6 years old, Children's language ability improves dramatically, and vocabulary is richer. Starting at age of 3 they need acquire 2500 new words each year (Roskos et al., 2004). In China, traditional teaching models focus on grammar and vocabulary knowledge, but these skills are often taught removed from real-life contexts and without meaningful contexts to apply the skills. Additionally,, the examination and evaluation system of Chinese education focuses on written ability, children' s oral language development in the classroom has been neglected, leaving a critical gap in the promotion of their oral language skills.

Even though the problem of learning oral English in China cannot be solved in a short time, the education department and parents have begun to develop a measure to improve the situation. The English Curriculum Standards for Compulsory Education, issued in 2022, explicitly states that language learning should focus on comprehension and use in specific contexts. This reform highlights the significance of oral language use in English as a Second Language (ESL) education. Not only is it a key component of language proficiency, but it is also

an essential foundational language skill for helping learners to communicate effectively in authentic scenarios.

Despite the intent of the reform, not all children in China gain instruction and exposure to English at a young age. In big cities, parents send their children to bilingual kindergartens or enroll them in separate English learning programs in an effort to help them to access English education. However, in remote areas of China, where the economy is undeveloped, educational resources are relatively scarce and opportunities for young children to learn English is scarce.. In rural areas, English learning starts in grade 3, with twice-weekly English lessons of 45 minutes each, their only exposure to English. Research states that language input is so important especially in critical period. To seize the critical period of language acquisition and ensure equitable learning opportunities for children in rural areas of China, it is imperative to implement early English education interventions for young learners in these regions.

### **Critical Period for Reading Foundation skills**

Children's reading foundational skills are already developing at the age of 3-6 years. According to Lonigan (2007), children's reading development begins long before they formally learn to read. The stage known as "early literacy emergence," suggests that the acquisition of reading skills is a gradual developmental process. In addition, the development of basic reading skills is based on oral language skills. Nicholas and Rouse's (2021) study states that young children's oral language ability is the foundation of reading skill development. Through in-depth interviews with Australian early childhood educators, the study found that the oral language development of 2-3-year-old not only indirectly affects reading decoding skills through phonological awareness, but also directly affecting development of reading comprehension.

Oral language is the foundation of reading skills. However, studies show that oral proficiency from only traditional teacher-student daily conversations is not enough. This is because there is not enough academic oral input. Gingras et al (2023) points out that although traditional teaching is effective in promoting the development of daily spoken language through teacher-student interactions, the lack of a stock of academic language still exists. The lack of exposure to academic language may affect the development of children's reading foundation skills and ability to understand curricular materials.

### **The Interplay Between Vocabulary Acquisition and Cognitive Development**

Vocabulary learning and cognitive development are mutually reinforcing. Vocabulary is the basic unit of language, and it is used to express specific concepts, things, emotions and behaviors. When young children learn academic language, they are also constantly developing their ability to understand and conceptualize the world. Piaget (1962) proposed that the theory of cognitive development consists of four main components: schema, assimilation, accommodation and equilibrium. Among them, schema is the most basic concept in cognitive structure, which helps individuals interpret and respond to various situations. Vocabulary acquisition, from Piaget's theory of cognitive development, is developed through a process of continuous accumulation of vocabulary and knowledge of syntax and discourse patterns. As learners learn new vocabulary, these terms are assimilated or accommodated to the learners' existing schema of acquired vocabulary knowledge. In vocabulary learning, the learner assimilates the new vocabulary into existing categories and creates new category for new words. Through assimilation and accommodation, our vocabulary is constantly growing. At the same time, our cognitive structure continues to be adjusted and reach equilibrium. Therefore, learners we can better analyze, understand and adapt to new language learning..

The process of vocabulary learning involves working memory, logical thinking, and flexibility. It can also be seen that there is a close link between vocabulary learning and cognitive development. Recent research has shown that vocabulary learning has important effects on working memory, flexibility, and control in young children. Thériault-Couture et al. (2025) tested 145 young children (51% boys, predominantly from White families) on three behavioral tasks assessing inhibitory control, cognitive flexibility, and working memory. The results showed that toddlers with large vocabularies performed better on executive functioning tasks (including working memory, cognitive flexibility, and inhibitory control), and that this advantage was maintained throughout early childhood. Language skills help young children understand task instructions and use strategies that enhance executive functioning. At the same time, the development of executive functioning promotes language skills, which in turn promotes vocabulary learning.

Learning new vocabulary requires us to constantly adjust and our cognitive structure. When we learn new vocabulary, we need to think and analyze whether to incorporate it into our existing knowledge system or to adapt a new cognitive structure. This not only exercises our logical thinking skills but also improves our cognitive flexibility. Additionally, vocabulary learning has a direct impact on working memory. Learning new vocabulary requires us to memorize the pronunciation, spelling, meaning and usage of words. This process exercises our memory skills, especially the transition between short-term and long-term memory.

A robust vocabulary knowledge leads learners to understand and solve complex problems; A solid vocabulary can enable learners to accurately describe the problem, consider strategies to address it, and find appropriate solutions.

In conclusion vocabulary learning and cognitive development are mutually beneficial. Through continuous vocabulary learning, learners not only enrich their expressive language skills, but also improve their thinking, memory, problem solving, creativity and flexibility. The improvement of these abilities in turn promotes vocabulary learning more effectively, forming a virtuous cycle.

Vocabulary learning is associated with cognitive development, and this also applies to second language learning. Learning two or more languages at the same time has a great impact on cognitive development. Muzaki (2024) states that the effect of bilingual language ability to accelerate cognitive development is observed in young bilingual children's ability to quickly and freely switch between their two languages. Children who start learning two languages in early childhood are particularly skilled in multitasking and can more easily adapt to new environments and situations. This advantage stems from the psychological development process they experience when switching between different languages, which significantly enhances the brain's executive functioning including attention, working memory, and cognitive flexibility. Some studies can confirm the view.

Dhar and Betal (2021) studied 100 primary school students aged 7-10 years old for one school year and found that second language learning significantly contributed to the cognitive and linguistic progress of learners at the elementary school level, particularly in the areas of executive functioning, problem-solving skills, cultural understanding, and academic performance. It also emphasized the importance of early second language learning in enhancing children's overall cognitive and language skills.

Another study by Baraka, El-Dessouky, Ezzat, and Al-Sharif (2019) confirmed that second language acquisition has a positive effect on children's cognitive development. During

the process of learning a second language, children construct a neural network that connects the new language to their mother tongue. This process not only activates and inhibits children's neural activity in different linguistic situations, but also hones their skills in how to choose words and self-correct when using the language development. By analyzing children's performance at different developmental stages, they revealed the positive impact of second language acquisition on cognitive development. These researchers believe that early exposure to a second language environment can significantly improve children's cognitive abilities. In summary, the benefits of second language acquisition for children's cognitive development are significant. It can stimulate brain development, expand thinking, and promote cognitive development.

### **Advantages of E-books over Print Books in Improving Children's Literacy Skills**

The popularity of e-books has provided rich and easily accessible learning resources for preschool children in China. E-books can provide rich language exposure, a crucial component for both for early child development and English language acquisition. E-books have a number of unique advantages in children's literacy development, especially in comparison to traditional paper books.

#### ***Independent Reading***

Print books are hard for children to read independently. Children who don't know many words often encounter unfamiliar words while reading. This breaks the flow of reading and makes them less eager to read. Print books help with carrying and having lots of stories, but they don't have tools to support independent reading. E-books, however, allow children read or listen to stories by themselves. This independence is important for building their reading skills. As Bus and Neuman (2009) noted e-books allow children to read or listen to storybooks independently and mimic the experience of adults reading physical storybooks to children. E-

books are considered to be an effective tool for enhancing children's literacy skills through these functions such as voice reading and text highlighting. Roskos et al.(2009) made a similar argument that e-books provide opportunities for independent practice and exploration that can help children develop new literacy skills, especially in the digital age.

### ***Vocabulary Acquisition and Reading Foundation Skills Improvement***

Vocabulary is one of the most important indicators of a child's literacy skills. Studies have demonstrated that e-books play a crucial role in advancing children's literacy abilities. López-Escribano, Valverde-Montesino, and García-Ortega (2021) found that e-books significantly boost young children's emerging literacy skills, especially in terms of vocabulary acquisition. E-books are believed to provide similar benefits to those gained from traditional reading and improve children's vocabulary (Smith, 2001). Other studies have shown that e-books can enhance vocabulary acquisition due to the highlighting of text during e-book activities (Korat and Shamir, 2007)

A study conducted by Zhou and Yadav (2017), which selected 72 children aged 4-5 years from several kindergarten in the Midwest of America explored the effects of the e-story book and questions strategy on vocabulary acquisition, story comprehension and participation. The e-storybook has touch-screen tablet device with automatic read-aloud, text highlighting, and interactive function, while the traditional storybook contains the same content as the e-storybook version but lacks the interactive features. Results of the study found that reading multimedia stories is more effective in supporting children's decoding and reading engagement than reading traditional stories when children are not asked questions during reading (Zhou & Yadav, 2017). Based on the above research, e-books show more significant advantages in vocabulary learning compared to traditional paper books. In addition, e-books can effectively promote the

development of children's phonological awareness, an important component of foundational reading skills, through a variety of interactive elements, such as phonics spelling exercises, phoneme segmentation and merging games. López-Escribano et al. (2021) revealed that interactive e-books promote the development of reading foundational skills including phonological awareness and vocabulary development.

### ***Language Enrichment and New Literacy Skill Development***

E-books change the traditional experience of adults reading storybooks with children potentially stimulating richer language and new literacy skills. (Roskos et al, 2009). While the shared reading process of paper books can promote interaction and language exchange between parents and children, there may be some limitations in terms of language richness and diversity. Although paper books can also provide some language input, children have relatively few opportunities for language output due to the lack of interactivity. E-books, on the other hand, through their rich interactive features can provide children with more opportunities for language practice, so that they can learn and use a richer variety of linguistic expressions in their interactions with the e-books. At the same time, e-books can also help children develop some new literacy skills, such as the ability to navigate digital texts and the ability to filter information, which are particularly important in the digital age.

To sum up, e-books support children's literacy development by providing self-directed reading and imitation experiences, facilitating vocabulary acquisition and reading foundational skill enhancement, stimulating language enrichment and new literacy skill development, and creating opportunities for independent practice and exploration. These many advantages support consideration of using interactive e-books over use of traditional print books and non-interactive

e-books .Therefore When chosen and utilized appropriately, e-books can be as effective as, or even more effective than print books in developing early literacy skills

### **E-books vs. Traditional Print Books on Decoding and Comprehension**

A series of comparative studies have explored the effects of multimedia e-books for young children versus traditional print books on word recognition and comprehension. To study the effect of reading digital storybooks on English vocabulary learning, Zipke (2016), compared the effect of vocabulary learning between two groups:1). a digital storybook group; and 2). a print book group. The results of the study showed that the word recognition scores of the digital storybook group were significantly higher than that of the students in the group that read aloud from the same type of print books. Similarly, findings from a similar study by Nayak and Silva (2013) concluded that the e-book reading group made greater gains in reading accuracy than the regular print group and there were no significant differences in language comprehension or word accuracy between the e-book reading group and the teacher-directed reading group. In conclusion, these results suggest that e-books are more effective for language learning, especially in decoding and comprehension and vocabulary acquisition, than traditional books.

### **Theoretical Foundations for E-Book Design: A Guide for Teachers and Parents**

E-book for young children are designed to emphasize important educational theories should be based on these following theories.

Piaget's theory of cognitive development (1962) posits that Through the four steps of schema, assimilation, accommodation and equilibrium, we can slowly adjust your way of thinking, so that your cognitive level can be improved gradually E-books promote this theory by engaging young learners' schema and promoting language and literacy growth through cognitive scaffolding. E-books build on children' s schema as they are based on daily life scenarios and

provide experiences that connect with children's previous experiences. In Chinese culture and context, the content of e-books can be more integrated with Chinese culture. To make the content of e-books more closely integrated with Chinese culture, we can start from two aspects: content selection and presentation. In terms of content selection, on the one hand, classic literary works such as *Journey to the West* are selected, and the difficulty level is designed according to the age of young children to stimulate their interest in Chinese culture; on the other hand, creations are centered on traditional festivals, folk arts and Chinese myths and stories to introduce the origins of the festivals, their customs, their cultural connotations, and the characteristics and crafts of folk arts. To better present e books, multimedia elements such as pictures, audio and video are first integrated, In addition to add some interesting interactive activity sessions, such as designing knowledge quizzes, cultural games and other interactive sessions, to increase readers' participation and learning interest, and help understanding and memorization. In addition, it is important that e-book content be age appropriate and suitable for children aged 3-6. Lastly, e-books gradually increase in difficulty moving from simple ideas and language to more detailed ones.

Mayer's multimedia learning theory framework (2001), states multimedia instructional materials that are designed according to the way human minds process will have better learning outcomes. In order to optimize multimedia learning materials, Mayer and Moreno (2003) proposed several methods. First, animation or pictures should match the speech. Second, text should be positioned close to the pictures. Lastly extra sounds or background music should be minimized so as to not distract from the content. Well-designed high-quality e-book, follow these principles to ensure maximum learning opportunities for young children.

Sweller (1988, 2010) states that working memory has a finite capacity and that e-books should consider, cognitive load of young children during the design phase. . To promote the children to manage cognitive load effectively and optimize the learning experience, the interface of e-books should be simple using simple and predictable methods of engagement. E-book design should engage children in developmentally appropriate ways with attention to working memory and cognitive load.

Paivio's dual coding theory (1991) suggests that we have two channels to take in information: one is through visual cues and the other is through the listening cues. The two channels work independently from one another. However when learners receive both auditory and visual stimuli, the channels mutually benefit each other. Therefore, the multi-sensory nature of e-books including stimulating pictures and synchronized speech benefit young learners. Key points in the e-books can be emphasized with illustrations or animation to help young children understand and comprehend words and concepts.

## Summary

This chapter focuses on five main areas: The first aspect explores the critical period of language development and it analyzes children's oral language development and basic reading skills at the age of 3-6 years and its influencing factors. The second part examines the relationship between vocabulary learning and cognitive development in terms of Piaget's cognitive theories, including the roles of working memory, thinking skills and flexibility. The third section investigates the advantages of e-books over paper books in improving children's literacy skills, comparing three main areas, The fourth part focuses on decoding and comprehension skills. The last part describes how e-books are designed based on cognitive

theory and multimedia learning theory and provides recommendations for teachers and parents when selecting e-books for children.

### **Chapter III Conclusions and Recommendations**

This study aims to explore how developmentally appropriate e-books promote English vocabulary learning among young children in China, to analyze the impact of e-books on young children's cognitive development, and to provide educators and parents with guidelines for choosing appropriate e-books. The background of the study is based on the theory of the critical period of preschoolers' language development, which emphasizes that effective language intervention during this period is crucial for children's long-term development. This study reveals the potential of e-books in promoting English language learning and cognitive development in young children by analyzing the critical preschool language period and the effects of language learning during the critical period, including the development of oral language and basic reading skills.

Through a comprehensive analysis of a large body of literature, this study finds that e-books have a significant effect on preschool children's English learning, especially in vocabulary acquisition. The paper shows that the interactive and multimedia features of e-books can capture young children's attention, stimulate their interest in learning, and provide rich language input. In addition, vocabulary learning and cognitive development are mutually reinforcing. Based on Piaget's theory of cognition, combined with recent research findings, young children can not only improve their English vocabulary, but also enhance their working memory, logical analysis and cognitive flexibility by reading e-books at preschool age. However, there is still controversy in this area in the academic community, with some studies suggesting that overuse of e-books may

have a negative impact on young children's attention span. Therefore, how to balance the use of e-books with traditional reading is an issue that needs to be further explored in future research.

The theoretical significance of this study is to integrate young children's critical-period language abilities and e-book advantages, revealing the facilitating effect of e-books on young children's language development, especially vocabulary development, as well as cognitive development. This finding enriches the theoretical system of children's language acquisition and cognitive development and provides new perspectives for research in related fields.

On a practical level, this study provides educators and parents with guidelines for selecting appropriate e-books to help them better utilize the benefits of e-books for early childhood English initiation. Especially in economically disadvantaged areas, reading interventions with e-books can provide early exposure to the English language in an efficient and cost-effective way, and fully stimulate young children's potential during the critical period. Lonigan (2007) states that language-rich environments play a key role in the development of children's phonological awareness. For children from poor and highly mobile families, the lack of adequate language input often makes it difficult for them to receive the language support they need to develop these foundational skills. E-books, an emerging form of reading that is easy to use and accessible, not only fills the gap in educational resources, but also meets the needs of young children's language development. Young children can learn English through media on devices such as mobile phones and tablets, greatly increasing their exposure to English and providing a rich source of language input.

Although this study reveals the potential of e-books in young children's English learning and cognitive development through systematic analysis, the limitations of the research methodology cannot be ignored. Because the literature samples were mainly from English core journals and the data were mostly from second language learners in other parts of the world,

important findings from local Chinese studies may have been overlooked. In addition, the study failed to fully consider the differences in the use of e-books by young children from different regions and family backgrounds, which may affect the generalizability of the findings.

Future research can further explore the effects of e-books on preschoolers' vocabulary learning and cognitive development by taking into account the local Chinese context through teacher or parent interviews and experimental data. Cross-regional comparative studies are recommended to analyze the differences in young children's use of e-books in different regions in order to develop more targeted interventions. In addition, future research could also focus on the effects of e-books on children of different ages and how e-books can be designed to increase young children's interest in reading and learning.

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