

Do Language Learning Apps Really Work?

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Abstract: With the rapid development of the mobile application market and the growing size of the foreign language learning population, learning a new language with an app can be said to be one of the most popular language-learning trends of the 21st century. At the same time, contemporary language learning applications sell themselves as innovations, in many ways that are just a return to Skinner's teaching machines as introduced in the 1950s. Technology is the 21st century, but the theories of learning are firmly 20th century. App designers must catch up to 21st-century theories of learning if they genuinely want to introduce ground-breaking tools. This work mainly analyzes why we will not make as much progress as we expected if we continue to pair 21st-century technologies with outmoded perspectives on learning and what are the up-to-date theories that will help make fundamental transformations in language learning applications.

Keywords: language acquisition, mobile apps, behaviorism, language learning application

1. Introduction

As one of the most highly emphasized subjects in the university entrance exam in China, English has been the priority foreign language in the Chinese educational system. According to the statistics, more than 300 million people in China are learning English, accounting for approximately a quarter of the total population. As the upsurge of English learning has reached an unprecedented peak in China, more and more English-learning apps have been developed. Meanwhile, a new way of learning that transcends the limitation of time and space became popular, significantly improving learners' enthusiasm and effectiveness of learning. As one of the most popular free learning apps in the Apple Store, Baicizhan has been welcomed by many learners with its novel learning methods and distinctive features. It is a multifunctional language learning app that integrates audio, video, text, and picture, offering example sentences, pronunciation practice, and relevant videos for each word. In addition, it covers vocabulary in all areas that cater to a wide range of users, providing a benign platform for English learners.

As Wang Yi, CEO of Baicizhan, says, "The traditional teaching methodology in which a single teacher faces a class of at least 30 students makes it impossible for teachers to give professional advice to every student. Moreover, the expense of having a private teacher is too high for most families." In order to improve this inefficient, traditional teaching methodology, Wang and his colleagues began to work on inventing a brand-new artificial intelligence app so that all students could receive professional guidance anytime and anywhere. As early as the 1950s, B.F. Skinner, a significant proponent of behaviorism, discussed the problem and invented a mechanical device similar to

Baicizhan. According to Skinner, “we have every reason to expect that the most effective control of human learning will require instrumental aid. The simple fact is that, as a mere reinforcing mechanism, the teacher is out of date” [1]. With tireless efforts, he invented "the teaching machine," designed to ameliorate teachers' inadequacy when teaching many students. However, whether it was Baicizhan in the 21st century or the teaching machine in the 20th century, they are rooted in behaviorist learning theory, particularly the primary laws of learning formulated by the pioneer of educational psychology, E.L.Thorndike: readiness, use, and effect. In the case of Baicizhan, Learners are attracted by this novel way of learning, coupled with continuous, repeated practice and satisfaction generated after each task is completed, which further promotes the motivation of learners to continue learning, thus generating a positive circular effect.

After years of surveying user reviews of Baicizhan, researchers found that the app helps learners remember vocabulary and grammar, but it was not as effective as expected. In other words, the effect is only reflected in the early stage, and then its effect becomes weaker and weaker, and sometimes there will even be memory biases. Why it happens, what assumptions about learning underlie this practice, and what alternatives to this way of learning exist are things educators need to wrestle with. In this work, I will first describe how this app is grounded in behaviorist theories about how people learn, mainly through two of three Thorndike's primary laws of learning. Next, I will discuss how adopting a different theoretical assumption about how learning happens raises questions about whether Baicizhan truly helps students learn English. In particular, I will focus on what the constructivist perspective brings to bear in an analysis of the utility of this app.

2. Literature Review

2.1. Behaviorism

In the early 20th century, the law of learning was put forward by Thorndike based on a series of experiments. In discussing the law, there are two main concepts: Law of Readiness and Law of Use.

2.1.1. Law of Readiness

According to Thorndike, the law of readiness emphasizes that learning takes place when the adjustment of preparation for action causes a tendency to act [2]. Learning efficiency will be significantly improved when learners feel eager and enthusiastic about the knowledge they learn. Conversely, the effect of passive acceptance of knowledge is often unsatisfactory. For example, if one is not prepared to learn, learning cannot be automatically instilled in him or her. In Baicizhan, learners are not limited by time and space. They can arrange and adjust their learning rhythm by themselves. To a certain extent, this ensures that people learn things out of their own will rather than passively accepting them. Based on the law of readiness, such a favorable mental state can improve learning efficiency.

Furthermore, Baicizhan uses various methods to mobilize learners' willingness to learn. For example, it adopts a multi-modal way of memorizing vocabularies, presenting a word from both visual and auditory aspects. Unlike rote learning, its example sentences are often enjoyable, innovative, and memorable.

2.1.2. Law of Use

The second law of learning Thorndike proposed is the law of use, which suggests that the more often an association is used, the stronger it becomes. According to his S-R Bond Theory, the association of stimulus and response is strengthened with frequent practice and is weakened when practice is discontinued [2]. In the case of Baicizhan, learners need to randomly review a word no less than twice

after learning it for the first time. Before learning new vocabulary, the next day, learners need to review everything they have learned the day before by reading Chinese translation and choosing the corresponding English word or vice versa. After studying the whole book, Baicizhan provides unlimited review opportunities for users to improve their memory. When learners believe that they have mastered the vocabulary book sufficiently, they can change a book by themselves. It can be said that the repeated reinforcement of the same word in Baicizhan is the most intuitive embodiment of Thorndike's law of use.

2.2. Constructivism

Seen through the lens of behaviorists, Baicizhan may be able to help users learn English efficiently. However, after years of surveying its user reviews, researchers found that there is a commonly shared problem among users: due to the multi-modal way of memorizing vocabularies embodied by the app, learners could indeed easily remember a new word, but they also forget the words they just memorized within a short time, as short as maybe just a few minutes. If we want to know why it happens, we will find entirely different answers by examining it through different theoretical lenses of learning. If one ascribes to a constructivist of learning rather than a behaviorist, the problem may arise in the process of practice and review. In the app, a new vocabulary is presented as "one example sentence + four pictures," where the example sentence contains the word to be learned. Only one of the four pictures is the correct option associated with the word. It was intended to stimulate the brain of learners to remember words by associating them with pictures. However, according to constructivist learning theory, people are not blank slates to fill with knowledge. Their existing experiences shape the way that they construct knowledge [3]. Therefore, when people learn a new word, they connect it with the existing knowledge in their mind, construct their own understanding of it, and ultimately assimilate this new experience in ways that make sense to them. From the perspective of a constructivist, when learners use Baicizhan to memorize words, the connection between words and pictures established by them is not necessarily the semantic meaning of the target word but rather the connection between the words they already know in the example sentence and the corresponding content in the picture. In other words, it seems that learners can make the right choice, but they may not grasp the meaning and usage of the target vocabulary at all. They only establish the connection between pictures and example sentences through their existing knowledge and experiences. When reviewing, learners mistakenly believe that they have mastered the target vocabulary by memorizing the pictures, but it is a very different kettle of fish. Over time, it is not surprising that learners feel that they remember quickly and forget quickly.

While behaviorists only value the observable changes in a learner's behavior, constructivists focus more on the process of constructing knowledge that takes place inside people's minds [4]. What one believes about learning is complicated, large-scale, and hard to define [3]. While at first glance, a behaviorist perspective seems to support the use of Baicizhan as a helpful educational resource. Its appearance undoubtedly provides a novel way of learning for people to memorize new words on a large scale in a short time. However, after examining it through a different theoretical lens on learning, we find that it may have some unintended consequences that run counter to its intended function. Using the previous example, we find that one obvious drawback is that it can quickly generate an illusion of learning or mastery. Learners perform a task or activity over and over until they eventually wrongly believe they have mastered it, generating a false sense of confidence [5]. Such illusions of learning cause people to overestimate how much they know about the target language, calling the learning effectiveness of Baicizhan into question. So here comes the question, if Baicizhan seems controversial, what strategies might language learning applications incorporate to better align their products with theoretically grounded research on language learning? Rather than proposing strategies for optimizing language learning apps that are detailed to the point of developing specific features or

functions, the following passage aims to illustrate how a learning theory framework, derived from and proved by real-world data, can be used to guide and inform modern language educators undertaking a study using grounded theory. All the research findings and recommendations are expected to provide references for policy optimization and learning resource development.

3. Theoretical Framework

3.1. Language Acquisition

Language acquisition is the process by which humans acquire the capacity to perceive and comprehend language as well as produce and use words and sentences to communicate [6]. So far, our approach to learning a new language is old-fashioned, requiring time, persistence, commitment, and practice. Although the amount of time and effort required depends mainly on individual learning and the learning environment and circumstances, generations of language researchers have found the general framework of language acquisition from practice. They divide language acquisition into two categories: first-language acquisition and second-language acquisition. First language acquisition refers to acquiring and mastering the mother tongue under natural conditions, like babies who listen to the sounds around them, imitate them, and eventually start producing words and sentences. Second-language acquisition, or SLA, is the process by which people learn new languages after a native tongue is established. Based on the knowledge and linguistic system of the first language, they acquire the ability to perceive and understand the second language.

3.2. Five Stages of Second Language Acquisition

Since 1970, countless language experts have developed a strong interest in second language acquisition and conducted considerable research on the topic from different perspectives. Stephen D. Krashen, who is an American linguist and an educational researcher, explored five stages of second language acquisition for the first time in his book 1983, *The Natural Approach* [7]. He believes that it is essential for everyone to understand the stages of second language acquisition because of the zone of proximal development, which is defined as “the distance between a child’s actual developmental level as determined by independent problem solving and the higher level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers.” [8] Knowing the learners’ second language acquisition level allows educators to work within their zone of proximal development, prevent them from sticking at any of the five stages, and help lift them to the next stage. In the following passage, the work will provide an overview of the five stages of second language acquisition and offer instructional strategies to provide a reference for educators to support learners at different stages of language acquisition.

3.2.1. Pre-production/Receptive Stage

The pre-production stage often involves a “silent period” during which students have minimal comprehension of the target language and may not speak but can express themselves using various strategies, such as pointing to an object, gesturing, nodding, etc. Krashen sees the “silent period” as a crucial preparatory stage for learners to develop their language skills by spending most of their time “listening” to others [9]. For learners in the pre-production stage, the very first thing educators need to consider is how to cultivate their interest in learning the target language. Since studies have almost unanimously shown that anxiety damages learners’ prospects for successful learning, testing or any educational strategy containing excessive error correction are not recommended, one proper instructional strategy that can be applied at this stage is Total Physical Response (TPR). It is a method of teaching language or vocabulary concepts using physical movement to react to verbal input. The

process imitates how infants learn their first language, and the point is to teach by gesturing and showing as much as possible. A good example is “Simon Saying” or “Head, Shoulders, Knees, and Toes.” Such activities help learners understand target languages and aid in long-term retention in a stress-free approach.

3.2.2. Early Production Stage

Building on the pre-production stage, part of the emphasis in the early production stage is still on listening and absorbing the target language. Beyond that, the individual begins to speak some essential words and form short phrases, even though they may not be grammatically correct. Continuing the instructional strategy proposed in the last stage, educators may also provide more opportunities for learners to produce simple language; for example, ask them to point to pictures and say a new word. Also, since learners still have limited comprehension and can only produce one- or two-word responses at this stage, it would be better to ask questions that they can answer in one or two words, such as yes/no questions and either/or questions. Answering questions like these is an excellent step to help them with their future speech and language development.

3.2.3. Speech Emergence Stage

By this stage, learners typically acquire an excellent comprehension of the target language. Speech becomes more frequent; words and sentences are longer; interpreting happens for a less period. Nevertheless, the individual still relies heavily on context clues, keywords, and familiar phrases. Although grammatical and pronunciation errors are often made at this stage, they begin to decrease in common or repeated communications. An effective strategy for assisting learners in the speech emergence stage should focus on providing learners with opportunities to practice their language expression skills. For example, showing learners a clip from a classic movie or cartoon and asking questions about the storyline would help them practice their ability to express themselves by reviewing and connecting with the vocabulary and grammar they learned in previous stages [10]. The main idea of such training is to engage learners in more conversations and let them be conscious of their language learning process.

3.2.4. Intermediate Fluency Stage

During the intermediate fluency stage, an individual can speak almost fluently in social language situations and can write using more complex sentences with fewer grammatical errors. As a result, he or she acquires excellent comprehension skills and is much more comfortable using the language. Most importantly, starting from this stage, an individual begins to think in their second language. To help learners in the intermediate fluency stage, instructional strategies should provide opportunities for them to engage in academic learning more independently and demonstrate higher-order thinking skills in the second language, such as offering an opinion or analyzing a problem. For instance, it may be helpful to introduce more academic skills like brainstorming, debate, critical thinking, rephrasing and restatement, and so on. Besides, corrections and feedback are necessary, even for errors that have no direct impact on meaning. From this stage, language learners should develop a more advanced mastery of language skills from all aspects.

3.2.5. Advanced Fluency Stage

Lastly, a language learner reaches the advanced fluency stage and acquires a near-native level of speech. Now, grammatical errors are no longer an issue for him or her. In addition, language use becomes automatic and natural. Even so, second language learners need ongoing opportunities to

engage in challenging activities to expand their knowledge and in academic discussions to express their ideas in second languages to maintain fluency. Knowledge is infinite.

4. Conclusion

Understanding learners going through a predictable, transparent, and sequential series of developmental stages helps educators work in learners' zone of proximal development by “scaffolding” their language learning stages. The amount of support they can provide to learners as they progress from stage to stage is maximized. Again, rather than offering detailed suggestions on optimizing language learning apps, the second half of the research paper provides an overview of the learning stages of second language acquisition and puts forward instructional strategies corresponding to each stage. Not only app developers but all scholars and researchers dedicated to the study of language acquisition should consider strategies to maximize the benefits for second language learners

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