An Analysis of AI Technology Assisted English Learning from the Perspective of SLA Theory

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Abstract: With the continuous development of artificial intelligence (AI) technology, its application in the field of education continues to deepen. AI-assisted English learning software such as LAIX and BaiCiZhan came into being. With such cool technologies as pronunciation evaluation and scoring, natural language understanding, machine learning, intelligent search and so on, it has won the favor of English learners. The integration of AI and the English subject will usher in a new revolution in English teaching. While paying attention to the application of advanced technology, it is necessary to follow the general rules of language learning and explore the effective combination of the two to achieve the goal of improving English level.

1. Introduction

With the rapid development of China's economy and the increasingly extensive communication with other countries, English, as a universal language, has received more and more attention, and the demand for English learning in China is also increasing. Research on how to optimize English learning effect and improve English learning efficiency is also increasing. With the continuous improvement of AI technology, the use of artificial intelligence technology to assist English learning has emerged. From the perspective of second language acquisition(SLA), this new technology assists English learning and conforms to the objective law of foreign language learning.

2. Raise of the problem

Artificial Intelligence (AI) was proposed at Dartmouth Society in 1956, which means a research and development process that used to simulate the extension and expansion of human consciousness, thinking and information. Overseas research and practice on the application of AI education started earlier and focused on a wide range, including the introduction of AI related technologies into real teaching processes, intelligent robots, intelligent evaluation technologies, knowledge engineering, artificial neural networks and other related technologies. Rick Rashid, Microsoft Chief Research Officer, has invented the "simultaneous interpreter" system by using AI technology. In her book Application of Artificial Intelligence in Second Language Teaching, American scholar Marina Dodigovic discussed the Applications of AI problems in second language teaching by combining English teaching and computer programming knowledge. The establishment of the Global Association for Artificial Intelligence Education and the establishment of authoritative academic journals such as International Journal of Artificial Intelligence Education and Application have guided the research of AI technology to expand into the field of language teaching. Chinese scholars have also made breakthrough progress in the application of AI technology in foreign language teaching. Professor Jia Jiyou of Peking University has developed the AI English teaching system CSIEC. Many emerging Internet platforms have launched a variety of AI technology-assisted English learning software, such as: LAIX and BaiCiZhan, They plan to better meet the different needs of different groups for English learning. Many researches focus on the technical level of AI, accompanied by the operation and promotion of business models. However, it is worth considering whether AI technology has followed the general rules of foreign language learning in the process of assisting English learning. Based on Krashen's SLA theory, this paper attempts to analyze the advantages and disadvantages of AI in assisting English learning.

3. SLA Theory

In the 1960s, linguists began to study the mechanism by which people acquire language ability, especially foreign language ability. They integrated linguistics, language pedagogy, neurolinguistics, sociology and developed a new theory: SLA. In the early 1980s, American linguist Krashen developed the theory of second language acquisition and put forward five hypotheses: Input Hypothesis, Acquisition-Learning Hypothesis, Monitor Hypothesis, Affective Filter Hypothesis and Natural Order Hypothesis. These theories has a profound impact on the theory and practice of second language teaching in China. Teaching practice shows that language acquisition rules must be followed in the formulation of teaching syllabus, the selection of teaching contents, the selection of teaching methods and the application of teaching measures.

4. An Analysis of AI Technology Assisted English Learning from the Perspective of SLA Theory

Through basic AI technologies such as natural language processing, intelligent search, text image recognition and processing, learning contents such as words, sentence patterns, grammar, pronunciation are imported into the software, so that users with different bases can learn according to their actual level, correct and practice according to feedback of the system. At the same time, users can learn English in any field at any time and place, which make English learning more interesting and efficient. As China's first adaptive mobile English class based on AI technology, LAIX constructs technologies related to "AI teacher", including speech evaluation, composition evaluation, adaptive learning technology and natural language dialogue technology etc.. "AI teachers" grade students according to their English level, recommend learning contents, and customize one-to-one courses.

4.1 Human-computer Communication and Affective Filtering Hypothesis

Natural language processing technology is one of the core technologies of AI, including speech recognition, text recognition etc., which realize the mutual conversion interface from text interface, graphic interface to natural language. Natural language processing technology is applied to language learning software and has the ability to understand and generate natural language. Learners communicate with intelligent chatbot in English through human-computer interface, creating a natural language communication environment, thus realizing human-computer integration. Word recognition technology can be used to help learners make grammatical, semantic and pragmatic analysis, speak or write sentences that conform to the situation and language logic. Take LAIX as an example, mobile internet technology supports learners to communicate with each other anytime and anywhere. The function of entering the gate and punching in can not only stimulate the learners to learn, but also play a very good monitoring effect.

Affective Filter Hypothesis holds that the process of second language acquisition is influenced by many affective factors, including motivation, self-confidence and anxiety. They filter learners' language input and determine the quality of learners' language input. Therefore, learners' affective factors play a certain role in the process of second language acquisition. Generally speaking, learners with high motivation, strong self-confidence and low anxiety can acquire language better, and vice versa. Learners speak English to their mobile phones or computers, which can reduce the anxiety caused by their face-to-face English communication with others and reduce their degree of emotional filtering. AI software interface creates a relaxed "input" and "output" environment, which enables learners to effectively learn in a relaxed and comforTable learning environment with a positive attitude and full enthusiasm. This avoids the phenomenon that Chinese students are shy of opening their mouths for fear of making mistakes and makes up for the silent, mechanical and inflexible teaching defects of traditional English classes.

4.2 Customized Learning Content and Input Hypothesis

After learners take English proficiency tests at AI software client terminals, the automatic

scoring system evaluates learners' English proficiency and lists sub-item scores such as listening, speaking, reading, writing, etc. Thus analyze learners' learning characteristics and push learning content that is consistent with learners' level. AI can also memorize the basic information of learners, such as gender, age, preference, etc., to more accurately push the content that conforms to the learning ability and habits of learners. If the result of test indicating that learner's English vocabulary and sentences are in low level, AI will focus on pushing simple words or phrases. If the clicks and reading time show learners prefer such contents as movies, literature and beauty makeup, AI technology will automatically push such contents. In AI English learning software, the learning style transformed from "teacher-centered", "textbook-centered" to "student-centered". The whole learning track can be digitalized and every learner may have his own learning way.

Input Hypothesis holds that the language materials (i.e. comprehensible input) that learners need to be exposed to should be slightly higher than his existing level, only in this way can learners understand and acquire them. When a learner comes into contact with a second language input whose comprehensible language input is slightly higher than his existing language level, the learner can focus on the understanding of meaning or information instead of language form, then language acquisition can occur. According to Input Hypothesis, second language acquisition is produced through a large number of comprehensible inputs. The ideal language input has the following characteristics: comprehensibility, interest and relevance, non-grammatical program arrangement and sufficient input. AI technology can adjust learning content according to individual differences and changes in learning process, push closely related learning content, and can greatly improve comprehensible input and learning effect.

4.3 Pronunciation Assessment and Monitor Hypothesis

Another remarkable function of AI technology is to automatically evaluate pronunciation. The computer analyzes the sound signals into numbers, compares the pronunciation characteristics of the same word of different speakers, and establishes an acoustic model. When learners practice the pronunciation of a word, it will extract the corresponding features and compare them with the acoustic model to obtain a comprehensive score. Through evaluation of learners' pronunciation, intonation, fluency and other aspects, pronunciation defects are analyzed and phonetic symbols and pronunciation adjustment exercises are provided. It supports repeated recording and gives real-time scoring for each spoken word of the learner. Thus, it is also helpful for English learners to adjust their further learning plan in time. The intelligent evaluation function makes AI software more like an advanced "English teacher" who repeatedly and patiently accompanies learners in language practice.

Monitor hypothesis set that learners can monitor the correctness of the language to a certain extent, and learners can use the grammatical knowledge they have learned to monitor the output words consciously. The human brain has two systems: the subconscious system related to acquisition and the conscious system related to learning. In the process of learning a foreign language, learners use the acquired grammar rules to detect the accuracy of the output language, and constantly learn to express accurately in this repeated learning process. The brain monitoring of the consciousness system is constantly playing its role. At the same time, the start-up of the monitor must meet the requirements of sufficient time, concentration and understanding of the rules. In the tense classroom atmosphere and peer pressure, it is often difficult for learners to make full and effective use of the brain's monitor function to pay attention to their own language expression and detect the accuracy of translation. However, AI software is not limited by time and space, providing learners with a personalized language acquisition environment, thus ensuring that learners have sufficient time and an ideal environment, concentrating their energy and attention on playing the "monitor" function of their brain, effectively monitoring and detecting the accuracy of their language output, and strengthening the results of English learning and acquisition.

4.4 Resource Renewal and Natural Oder Hypothesis

Machine learning is another important feature of AI technology. The process of machine learning is one of a large number of studies, the system will record each process in the database and

call up this result the next time when such similar tasks are performed. When the learner selects the content to learn and sets the learning time, the backstage of the system will reasonably promote the relevant content for the learner according to the time schedule. If the learning task is not completed this time, the vocabulary and phrases that have not been learned will still exist when the learner start again next time. Regular and quantitative push of relevant learning information greatly meets the personalized needs of learners in the process of learning English. In LAIX, a large number of learning content are updated daily, AI forms the knowledge map instead of simple repetition of similar knowledge, The learner will learn from the whole picture rather than different points.

Natural Order Hypothesis holds that no matter what language the learner's mother tongue is and no matter what the cultural background is, the general order in which they acquire second language grammar is the same. Some grammatical rules are acquired earlier, while others are acquired later. Therefore, second language learning must follow general rules, taking into account the characteristics of learners' age, memory, understanding and language use, etc., to ensure that the selection of materials and the arrangement of exercises from lower level to higher level, and to minimize the obstacles in the learning process. The customized courses based on AI technology respect the learning rules in selecting learning materials while repeatedly pushing learners' unfinished tasks.

4.5 Situational Learning and Acquisition-Learning Hypothesis

Virtual Reality (VR) creates a dynamic world to be simulated through a computer. The three-dimensional visual environment can make the operator feel as if he were on the scene. Learners can choose to enter a preset virtual scene. Through panoramic photo, video, 3D model, 2D graphics and audio and other technologies, English learning can be very wonderful experience. It allows learners to experience different moods, emotions and atmospheres in different scenes through "creating environment" with changes in music, smell, color, light, etc. Language learning is greatly influenced by environmental factors. The traditional top-down monotonous learning mode has limited knowledge accumulation and simple rote learning. VR technology enriches learning methods, creates a relaxed learning atmosphere similar to games, and makes the knowledge learned more intuitive and vivid.

According to Acquisition and Learning Hypothesis, there are two ways to learn a language: acquisition and learning. Acquisition is like children learning their mother tongue, which is naturally absorbed subconsciously and imperceptibly forms a sense of language in language communication. What they learn is the grammar rules that learners consciously and systematically learn to learn languages. The comprehensive language ability of learners includes both "acquisition" factors in subconscious state and "learning" factors in conscious state. In its "Situational Learning" part, LAIX uses VR technology to create a series of immersive scenes, including campus life, travel, business and workplace, etc., which is suiTable for users with different bases. According to different scenes, listening, reading and oral communication exercises can be set up. The memory of multi-channel information input is stronger than that of only language forms.

5. Existing problems and suggestions

The application of AI technology in English education is still in the development stage. Researchers and developers are mostly computer professionals, they are more keen on improving the technology and system of language teaching system to make the system more intelligent. Their development limit is to use technology to change education, change the world and eventually surpass human intelligence. Therefore, the application software may blur the research and requirement of pedagogy, linguistics, psychology and other related disciplines, neglect the educational laws, principles and methods that should be followed in the process of language learning, and neglect the important role that teachers can not be replaced by intelligent teaching system. The problems are listed as follows:

(1) Learners may rely too much on the evaluation results provided by the system, and there

might be deviations in pronunciation evaluation. If learners rely too much on the system, it will certainly cause problems. No matter how hard you try, you can't reach the ideal score, which makes learners feel frustrated and self-efficacy decreases. This also violates the affective filter hypothesis and is not conducive to the effective acquisition of learners. Younger learners tend to form the learning habit of being dominated by machines, evaluating their learning by referring to machine scores, and correcting pronunciation and grammar errors according to machines. Such passive learning makes their brain not actively monitor, also violates Monitor Hypothesis, reduces learning enthusiasm, and has little learning effect.

(2) All kinds of English learning software resources are updated daily thanks to AI technology. Without the guidance of teachers, learners are at a loss as to what to do with the huge amount of resources. They are unable to select suiTable learning resources for their own English level, blindly reading and listening are not conducive to comprehensible input. It is obviously not in line with the Natural Order Hypothesis that resources are not sorted and studied at will. The acquisition of language knowledge follows a natural route and is not changed by explicit teaching. Second language acquisition will only occur when the input becomes the absorbed language. Disordered learning seemingly make the language input, but it can not be understood. Sometimes even if the input is understood, it is not processed by the learner's internal mechanism, and the result is still in vain.

(3) Learners learn differently from machines than from humans. The machine provides language structure templates. If the learners learn it in a long term, their English expressions are "modeled" because they adopt the same communication method in different scenes. No matter how "smart" the intelligent equipment is, it is difficult to form logical thinking of language based on specific scenes and also take a country's culture and communication methods into consideration. As an oral IELTS examiner in China pointed out, some candidates who don't know each other have almost the same answers when answering questions, which indicates that the candidates may be memorizing templates. This shows complete dependence on machine and learn language from machine run counter to the Acquisition-Learning Hypothesis, which is hard to achieve good language proficiency.

In the era of AI, English learning can be realized through software, which provides personalized scientific services according to each person's characteristics and requirements. According to the linguistic principle of language learning, the software carries out personalized design and guides learning according to the level of each user. However, the risks such as system operation problems, machine-dominated learning, only mastering knowledge but neglecting the cultivation of ability also follow. In view of this, there are some suggestions, first of all, we should give full play to the guiding role of teachers and pay attention to developing learners' autonomous learning ability. In the evaluation of AI, teachers should introduce a comprehensive consideration of students' emotions, attitudes, values and other aspects, instead of taking systematic evaluation reports as the only evaluation criteria. Secondly, interaction, good classroom environment and communication with peers are also needed after the input of corpus, which is helpful to increase comprehensible input. Interactive adjustment in two-way communication can provide comprehensible input and help promote second language acquisition. Social interaction can also provide learners with the most suiTable language materials for learning, while the brain must find relevant patterns suiTable for such input.

Acknowledgements

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