| **RESEARCH ARTICLE**

A Discussion on the "Charging Model" of the Collaborative Mechanism Between Teachers and Artificial Intelligence Based on Satir's Iceberg Theory

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| **ABSTRACT**

In recent years, artificial intelligence has become a new direction of scientific and technological development. Machine learning, as the most core and hot technology in the field of artificial intelligence, provides the possibility to meet the needs of intelligent education and personalized learning. Through the desktop research method and literature research method, this paper sorts out and analyzes the EAI and Satir's iceberg theory and finds a new educational model that can be integrated with each other -- the "charging model". On the basis of EAI's ability to improve classroom efficiency, this paper proposes a "charging model" to explain and analyze its feasibility. It also uses Satir's iceberg theory to deepen humanistic concern and pay attention to classroom humanistic management to help students realize the third birth and fulfill the historical burden of teachers' "teaching and educating". Meanwhile, it promotes deep learning of artificial intelligence and improves affective computing.

| **KEYWORDS**

The Satir's iceberg theory, EAI, Two-teacher class

1. Introduction

Students are like batteries, constantly consuming their own electricity in the internal consumption of life and study, and there will always be a time when they need to be "charged". However, teachers' energy is limited after all, and they cannot accurately identify and help students in "low power mode". However, artificial intelligence educational assistants based on Satir's iceberg theory can help teachers analyze students' electricity and then more accurate and efficient charging. At the same time, students convey their inner spiritual needs to the AI educational assistant through the changes in behaviors and expressions, and the AI educational assistant then processes the information and feeds it back to the teacher, who then gives treatment to the students with their own guidance or actions, thus protecting the mental health of the students. At the same time, the teacher will feed it back to the AI education assistant to enrich the AI database and promote its deep learning. Therefore, this paper proposes the "charging model", a collaborative mechanism between teachers and artificial intelligence based on Satir's iceberg theory, and discusses it.

2. Research Purpose and Research Method
2.1 Research Purpose

With the passage of time and the rapid development of computer information technology, the construction of educational information has entered a new stage of rapid development. The researchers shared and introduced a number of advanced new education concepts with the construction of smart campus as the core: smart campus construction, digital teaching, teaching for the wise, learning for the wise, learning environment and resources only for the wise. Intelligent quality teaching, education school robots, etc. From the development status of education schools and the focus of researchers, the current pedagogy correction is developing towards two directions: digitalization and intellectualization, personalized and precise service, and equalization of

public service. The core values of all the sages are supported by the technological comparison of smartphones. To some extent, AI technology is the core force in the development of smartphone education schools.

2.2 Research Method

This paper uses interdisciplinary research, case analysis, exploratory research and innovative thinking methods to explore the problem. In this paper, the data collection method is desktop research. The research object of this paper is the connotation and feasibility analysis of the "charging model", the interdisciplinary combination of design pedagogy, artificial intelligence, psychology and other disciplines. Through the analysis of cases, some conclusions are drawn, and then these conclusions are proved. The desktop research method is used to collect, sort out, record and summarize relevant information to help us prove these conclusions. It provides an objective and scientific basis for us to reach universal conclusions.

However, this study also has certain research limitations. As an individual case, this study cannot fully draw more conclusions. The supporting data in this study are those of recent years, not primary data, which may lead to some acceptable errors.

3. Current Situation of Teacher-Student Ratio Education

According to the 7th National population Census conducted by the National Bureau of Statistics, 15,467 people received a college education or above per 100,000 population. The number of people receiving high school and secondary vocational education per 100,000 population was 15,088; The population receiving secondary education per 100,000 population was 34,507; the Census primary education population per 100,000 population was 24,767; The illiterate population in the census was 37.75 million; The census illiteracy rate was 2.7%.
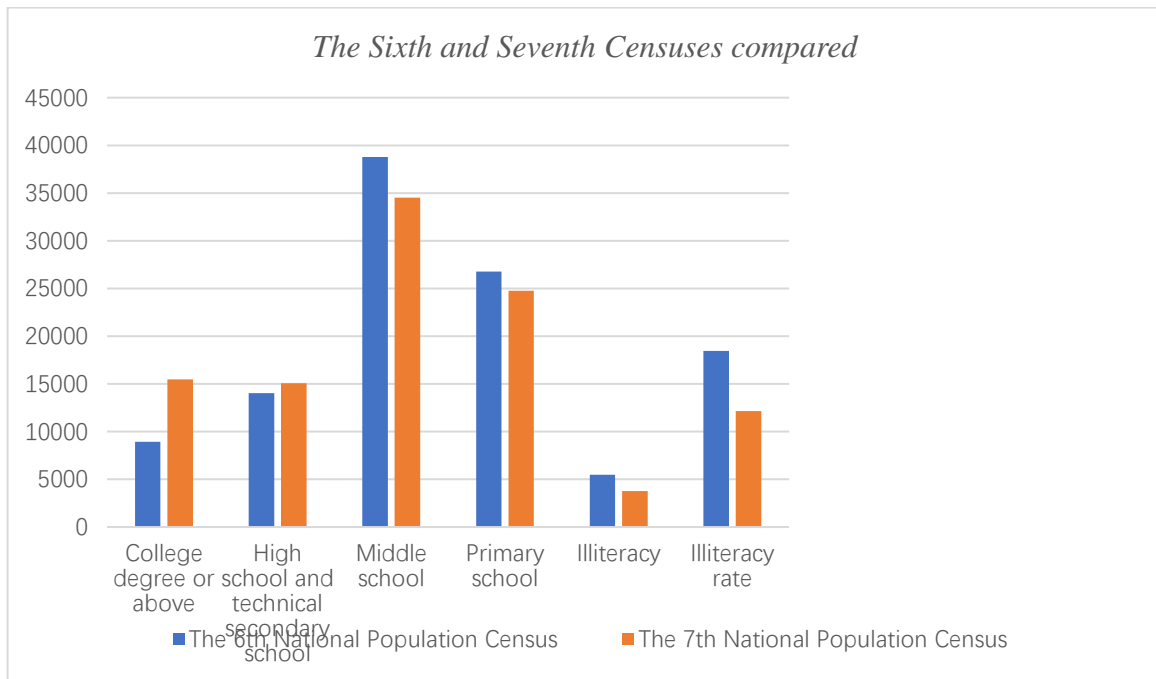

Figure 1. The Sixth and Seventh Censuses compared

At the same time, China has more than 529,300 schools of all levels and types, including 291,000,000 students and 18.443,700 full-time teachers. The teacher-student ratio is 1:16.33 in primary schools, 1:12.64 in junior high schools, 1:12.84 in senior high schools and 1:18.86 in secondary vocational education (Ministry of Education of China, 2022).
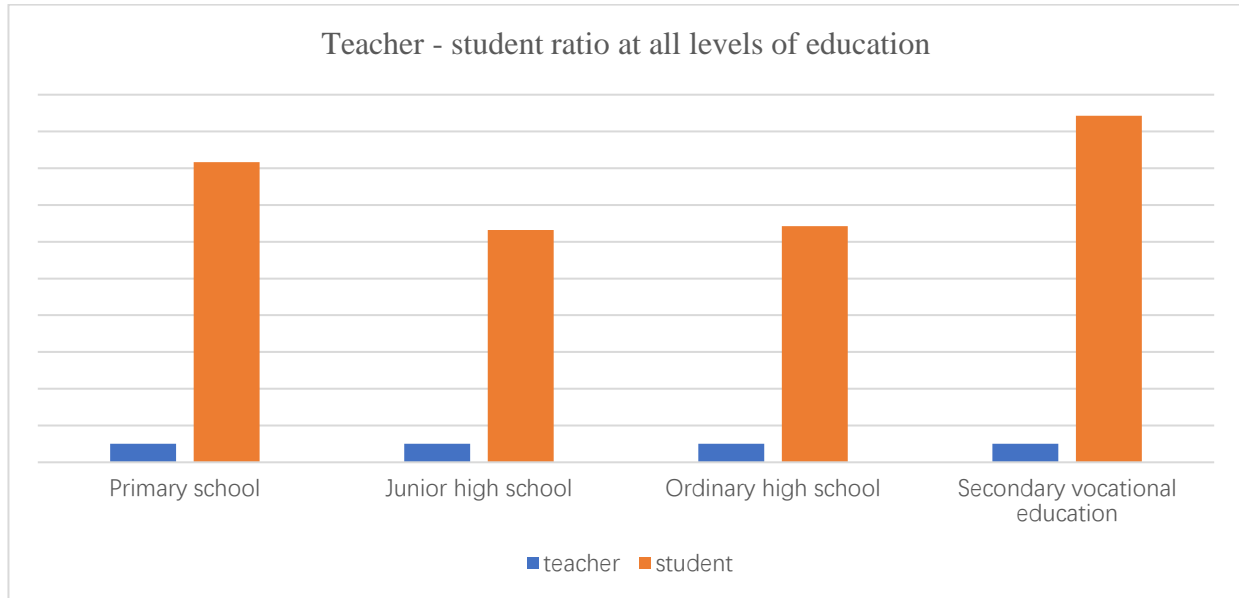
Figure 2. Teacher-student ratio at different educational stages

Based on data and charts, we know that, with the continuous advance of deepening reform of the Chinese educational system, the number of educated people in our country is increasing continuously; therefore, teachers need to face many students teaching; however, the responsibility of teachers is not only to prepare for classes, the more is to educate students, help students form a correct three-perspective. In the case of such a large gap between teachers and students, how teachers should pay attention to humanistic management while improving classroom efficiency, how to correctly deal with students with different personality characteristics, how to take into account each student's emotional changes, and how to help students establish correct values, are all worth our deep thinking.

4. Combining Iceberg Theory with Education
4.1 The Definition of Satir's Iceberg Theory
Satir's "self" theory puts forward an interesting metaphor: The human "self" can be seen as a huge iceberg. Its appearance can be seen by us, but its deep meaning can not be ignored; it represents a unique individual; it has a complete, profound, real self.

In Satir's model, the personal iceberg theory is divided into seven distinct layers. Behavior: Action, story content: Coping style: accusatory, flattering, hyper-rational, forked, consistent; Feelings: feelings of joy, excitement, infatuation, anger, hurt, fear, sadness, etc. Opinions: beliefs, assumptions, preconceived positions, subjective reality, cognition, etc.; Expectations: including expectations of oneself, others, and others (as one thinks); desire: to be loved, to be recognized, to be accepted, to have a sense of belonging, to have value, significance, freedom, etc.; Self: Vitality, spirituality, spirituality, core, essence.

When an event occurs, what people can perceive is only the words and deeds on the surface, which are endowed with the meaning and interpretation of the experienced event, thus producing the corresponding emotional experience. As for what happens inside the body, there's no way to know. Because people tend to assign meaning and interpretation to others' words and deeds based on experience but lack real understanding, this leads to the lack of real understanding between people, thus affecting the occurrence of communication and conflict.

Figure 3. Satir's iceberg theory

4.2 Using Iceberg Theory to Analyze the Psychology of Teachers and Students

Let's first learn a case: Little W has been doing well in the study since childhood, but his parents were afraid of his pride and constantly beat him. Later, he became very inferior and thought he was not as good as others, and his grades also began to decline. He became afraid to speak up and was afraid of saying wrong things. Once a teacher called his name and asked him to answer a question, he stood up and hemmed and hawed for a long time and finally got it wrong.

In this case, if the teacher's response is: no problem is found, no timely feedback is given, and W is made to stand for 5 minutes as punishment, and W does not say a word and accepts the punishment.

Let's analyze the inner iceberg of teachers at this time. The teacher's behavior is to criticize the students; its original intention is to hope the students to listen to the lessons. The way to overcome the teacher is to blame and punish; at this time, the feeling is angry, but the feeling is frustrated and helpless; in fact, the teacher wants to express their own views in the classroom to answer questions, speak boldly, and the teacher's inner expectation is to hope that their courses can teach well enough, more attractive to the students, A teacher's heart craves respect and recognition.

Then we will analyze the inner iceberg of students: students' behavior is to answer questions hesitately and answer wrong, the way to cope is to say nothing, accept the punishment station, and at this time, students feel shame, sad, frustrated, students think that they can do nothing well, sorry teachers, thus becoming more self-abassive.

On the contrary, if, in this case, after W gave a wrong answer, the teacher had already assumed a teaching position for himself based on the iceberg theory and already had the subjective cognition that "teachers should encourage students", he would be encouraged to continue his efforts, so as not to blow his inferiority. If teachers not only look at the external behavior of students but use the iceberg theory, understand the iceberg of students, students desire what they hope, in a more appropriate way, it will get twice the result with half the effort.

5. Combining Integrating Artificial Intelligence with Education

5.1 The Implications of Artificial Intelligence in Education

In recent years, artificial intelligence has become a new direction of science and technology development, and gradually, out of the laboratory, our economy and life have brought significant changes; the future life is also gradually toward the direction of "intelligent" development. Artificial intelligence itself is an interdisciplinary subject simulating human ability and intelligent behavior (Luckin & Holmes, 2016), which is applied to computer science, cybernetics, information theory, neurophysiology,

linguistics, psychology and other fields. Artificial intelligence focuses on how to promote efficient learning, involving many disciplines such as pedagogy, psychology, linguistics and sociology (Sawyer, 2010).

Educational artificial intelligence (EAI) is a new field formed by the combination of artificial intelligence and learning science (Luckin & Holmes, 2016). There are two goals of educational AI: one is to promote the development of adaptive learning environment and the efficient, flexible and personalized use of AI tools in education (Luckin & Holmes, 2016); The second is to "use precise calculations and clear forms to represent the ambiguous knowledge in pedagogy, psychology and sociology" (Self et al., 1999), so that artificial intelligence can become an important tool to open the "black box of learning" (Luckin & Holmes, 2016). In other words, educational artificial intelligence focuses on a deeper and more microscopic peek and understanding of how learning happens and how it is affected by various external factors (such as social economy, material environment, science and technology, etc.) through artificial intelligence technology, so as to create conditions for learners to learn efficiently.
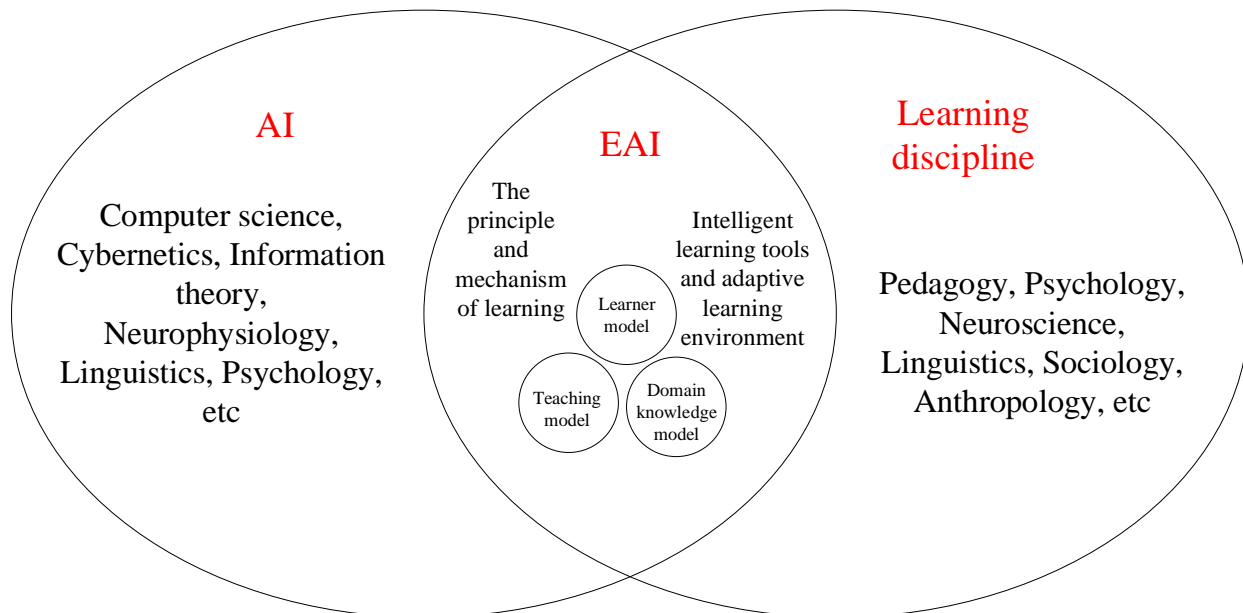

Figure 4. EAI definition

5.2 "Two-Teacher Class"

The current state of education requires multi-sectoral collaboration and a huge investment of time and human resources. Therefore, it has become an inevitable trend in the information age to promote the innovative development of education and teaching through the innovative development of intelligent education informatization (Zhu, 2016). Machine learning, as the core and most popular technology in the field of artificial intelligence, can automatically identify patterns, discover rules and predict students' learning performance based on large amounts of data, making it possible to meet the needs of intelligent education and personalized learning (Yu et al., 2018). For example, the learning partner education robot can help students finish their homework; on the other hand, it can also act as a playmate for the students and give feedback on the situation of the students at home at any time.

As a new teaching mode, "dual-teacher classroom" has been widely used in primary and secondary schools. In this mode, one teacher guides students remotely via live video or other means while another teacher answers questions and teaches interactively. Some studies have also proposed the concept of a "double teacher", whereby each student can use the Internet to diagnose their own professional problems and benefits outside the classroom, in addition to the facial movement teaching services provided by school teachers. On the basis of diagnosing the problems and strengths of their own subjects, one-to-one online tutoring is provided for each subject (Liang & Liu, 2018). However, the "dual-teacher classroom" still has some problems in practice, such as the lack of sufficient interaction and personalized guidance. Therefore, we considered applying educational robots to "dual-teacher classrooms" to solve these problems.

We believe that the application of educational robots can improve the teaching quality of "dual-teacher classroom" to a certain extent. First of all, educational robots can provide students with richer learning resources, such as interactive questions and answers, intelligent recommendation related learning materials, etc. Second, robots can enhance the interactivity of the classroom

and stimulate students' interest and participation in learning. However, due to the technical limitations of educational robots and the individual differences of students, appropriate intervention and adjustment by artificial teachers are still required. Through the "dual-teacher classroom" model, artificial intelligence education robots make up for the lack of teachers unable to personalize students, and teachers make up for the shortcomings that artificial intelligence cannot be too flexible.

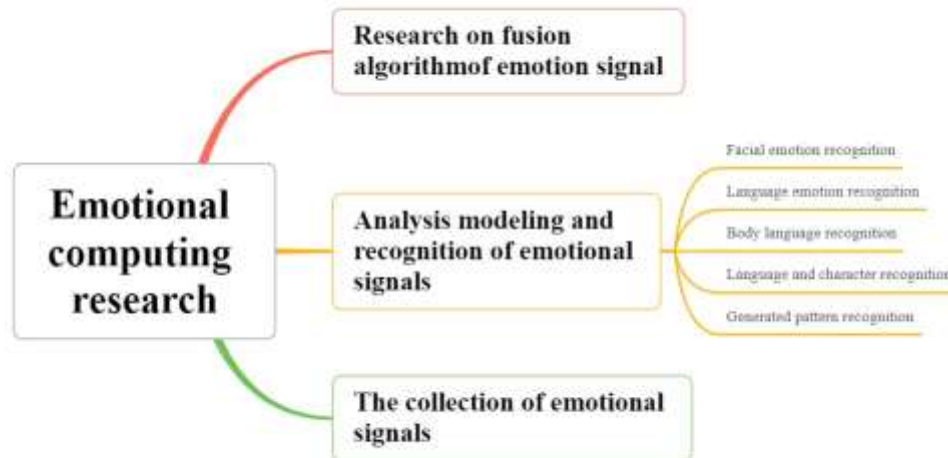### 5.3 Affective Computing

Figure 5. Artificial intelligence affective computing

Professor Picard of MIT Media Lab put forward the concept of emotional computing in 1997 and pointed out that emotion and emotional computing are related, that is, by giving the computer the ability to observe, recognize and discriminate human micro-expressions and finally understand and express human emotions, it is not the robot that has human emotions.

Emotion computation includes emotion "recognition", "expression", and "decision". "Recognition" refers to the robot's observation and analysis of human facial movements and micro-expressions, which are uploaded to the database for big data matching to obtain the most accurate emotion. The emotion here is not the exact emotion but a product of fuzzy calculation, that is, some smile, some helpless, some pain. "Expression" is the artificial intelligence to choose the appropriate carrier of emotion through language, expression, action, tone comprehensive expression. "Decision" focuses on how to use emotional mechanisms to make better decisions.

Emotion research can be understood in two ways: from a biological perspective and from a psychological perspective. All kinds of physiological parameters of human beings, such as face microexpression, pulse, heartbeat frequency, etc., can directly or indirectly reflect the emotional state of human beings. Physiology, on the other hand, uses sensors to receive and process information and uses that information as a basis for revealing human emotional states. Picard focuses on the processing of physiological signals and has made many achievements.

Artificial intelligence emotional computing is undoubtedly the next spring of artificial intelligence, when artificial intelligence, with the help of emotional computing, distinguish student behavior, action, tone, volume, judge the real-time psychology of students, and then more accurate analysis of the state of students at that time, and timely reflect the teacher of the two teachers. It can be seen that the development of artificial intelligence emotional computing has undoubtedly improved the link that educational robots respond to student information teachers in the dual-teacher classroom, making the dual-teacher classroom more accurate and accurate for every student.

6. Combining Iceberg Theory with Educational Artificial Intelligence

Artificial Intelligence Educational Assistant (EAI) is a new field that combines artificial intelligence with learning science. EAI focuses on understanding and learning how to learn through AI technology and is influenced by various external factors to create conditions for learners to learn effectively. EAI uses cameras that capture facial expressions and gestures, as well as algorithms that recognize and understand these human emotions so that the machine can sense the user's emotional state. In business, emotion-expressing robots have been developed. For example, Hire Vue is a website that evaluates the emotional performance of candidates based on their videos to help employers select employees who are more suitable for the job (Luckin & Holmes, 2016).

In the future, AI can study students' behavior (the first layer of the iceberg), then analyze students' feelings (the third layer of the iceberg), feed back to the teacher, and the teacher responds, or through feelings, AI analysis, analyze concepts, design students' expectations and wishes, and then develop coping strategies according to the teacher's approval, and treat students.

Therefore, we propose the "charging model", a collaborative mechanism between teachers and artificial intelligence based on Satir's iceberg theory.

7 "Charging Model"
7.1 The Connotation of "Charging Model"
"Charging model" is a new educational mechanism proposed on the basis of the integration of Satir's iceberg theory and EAI -- a collaborative mechanism between teachers and artificial intelligence based on Satir's iceberg theory. The emotional calculation based on Satir's iceberg theory is more accurate, and the artificial intelligence educational assistant can capture the emotional changes of students in class at any time so as to better provide students with personalized learning and timely report the situation of students to teachers.

Satir believed that there were three births and that in the first two births, people didn't make conscious choices. When people successfully integrate and find a new sense of self, they are born a third time.

The "Charging model" consists of five parts: Satir's iceberg theory, artificial intelligence, teachers, students and the Third Birth. Students are the "battery", teachers and artificial intelligence are the positive and negative poles of the "battery", the iceberg theory is the charging material of the "battery", and the third birth is the "lamp" powered by the "battery". To turn the light on, it takes a raw material to power it, a complex chemical reaction that uses the positive and negative electrodes to charge the battery and turn it on. In other words, teachers and artificial intelligence educational assistants analyze and adjust feedback based on Satir's iceberg theory to help students change their inner iceberg and realize the birth of the third degree.

At the same time, this paper also puts forward five states of battery in the "charging model": "full charge" state, "low charge" state, "medium charge" state, "fast charge" state, "overflow" state.

"Full charge" state means that students are in a good state in class, listen carefully and answer questions actively, which is an ideal state. The state of "medium power" refers to the fact that students sometimes lose their minds in class and lose their concentration, which is a common state in class. At this time, the AI educational assistant can find out the students who are in a poor state in class through micro-expression analysis and give certain reminders. The state of "low power" refers to the state that students are often silent in class, do not answer questions actively, have low self-esteem and feel tired from studying. Although students are in class at this time, their learning efficiency is very low. At this time, the artificial intelligence educational assistant recognizes the state through micro-expression analysis, gives some encouragement, and gives feedback on the state to the teacher, who provides some psychological assistance to them. Help students out of the haze; "Fast charge" state refers to a process in which teachers and artificial intelligence education assistants provide psychological assistance to students in the state of "low battery". Based on Satir's iceberg theory, this process will greatly improve the success rate of helping students out of the haze. It is similar to the "fast charge" process of mobile phones because it is called "fast charge" state. The state of "electricity overflow" refers to the fact that students are too conceited and complacent. At this time, teachers and artificial intelligence education assistants will give them certain guidance, and students have good character of modesty.

7.2 Feasibility Analysis of "Charging Model"
Through the desktop research, we can know that the education based on the Satiya iceberg theory is more in line with the current educational goal of "cultivating youth, adolescents and children in moral, intellectual, physical and other aspects of all-round development, to become ideal, moral, cultural and disciplined construction talents", and more helpful for teachers to practice the mission of teaching. However, according to the theory of individual differences, Teachers can't be "perfect" and treat every student equally. At the same time, they can't pay attention to the subtle emotional changes of every student while preparing the lessons.

The artificial intelligence based on Satir's iceberg theory captures the emotional changes of students through micro-expression analysis technology and provides incentives and appropriate help to students at the right time through accurate emotional calculation so as to provide more personalized learning opportunities for students and help them reshape the iceberg. However, cold science and technology can never replace warm hearts. Although this model affirms the dominant position of students' learning, it ignores that teachers are the helpers and guides in students' learning. It is worth noting that classrooms that are replaced by cold machines and lack humanistic feelings are by no means excellent, efficient and high-quality classrooms.

Artificial intelligence technology is promoting the rapid development of educational informatization. However, in the process of promoting the application of AI in education, there are still many specific problems worth discussing and need to be solved urgently (Zhu, 2016). How future teachers will adapt to the changes brought by artificial intelligence and how artificial intelligence can be better integrated into the classroom are questions that need us to think deeply.

Based on this, this paper discusses the "charging model", a collaborative mechanism between teachers and artificial intelligence based on Satir's iceberg theory. This model integrates Satir's iceberg theory with education and science and technology, which is more helpful for students to realize the third birth. Satir's iceberg theory is electricity; students are batteries, teachers and artificial intelligence educational assistants are the positive and negative poles of batteries, and the birth of the third degree of students is the light bulb. Satir's iceberg theory provides "electricity" for the battery. Teachers and artificial intelligence capture students' emotional changes through micro-expression analysis and obtain "electricity" in time to "charge" them. If the artificial intelligence recognizes students as "low electricity", it will provide timely feedback to the teacher, who will give more emotional care to the students. For its "fast charge", or teachers identify students as "low electricity" to give students more emotional care for its "fast charge". At the same time, teachers feed back student data to AI to enrich the AI database and promote its deep learning. In the "charging" between teachers and artificial intelligence, students "light up" the bulb, that is, reshape the iceberg and realize the third birth.
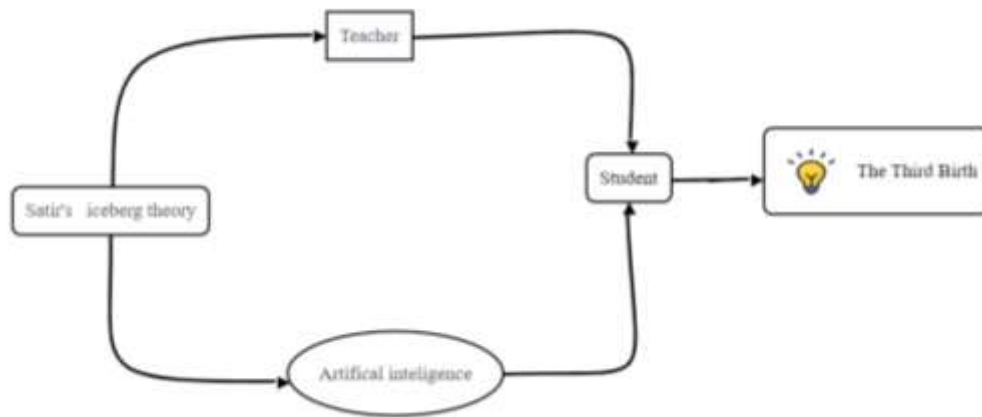

Figure 6. "Charging model"

In W's case, when W gave a wrong answer, the teacher had already assumed a teaching and educating stance based on the iceberg theory and already had the subjective cognition that "teachers should encourage students" so as to encourage them to continue their efforts, so as not to deal a blow to their inferiority. Meanwhile, the artificial intelligence education assistant captured w's distress, struggle and loss through the analysis of his micro-expression, and if he was slightly depressed, Artificial intelligence (AI) educational assistants also provided encouragement and help after class. However, in this case, the artificial intelligence education assistant found that the situation was rather complicated and would give feedback to the teacher, who provided W with more psychological and life help. Gradually, W changed his subjective cognition that he was not as good as others, became more confident and increased his expectations for himself, and his psychological desire for recognition was satisfied. He gradually became more lively and cheerful and began to make continuous progress in his studies. Finally, he rebuilt his iceberg, greatly reducing the influence of his original family on him, and realized the third birth.

8. Conclusion

Through the methods of desktop research and literature research, this paper expounds Satir's iceberg theory, raises questions in view of the current status of education, systematically analyzes the status of the combination of education and artificial intelligence, and the possibility of the application of Satir's iceberg theory in education and artificial intelligence. Then, the author puts forward the "charging model", a collaborative mechanism between teachers and artificial intelligence based on Satir's iceberg theory and discusses and studies it. Looking forward to the future, the "Charging model" will not only improve classroom efficiency but also pay attention to the psychology of every student so that students can truly achieve all-round development of morality, intelligence, physical beauty and labor, form a complete personality, and realize the third birth.

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