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# Research on the Educational Mode of "Three-Ring Interaction" Man-Machine Cooperation Based on "Seven-Time-Pass"

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**Abstract**

The purpose of this paper is to introduce the research on the education mode of "three-ring interaction" based on "seven-time-pass". Its method is to adopt three groups of comparative research approaches: man-machine mutual assistance and interpersonal mutual assistance, including personal self-help. The result is that, not only the responses of the two software AI systems are completely different, but also the comparative advantages of the three research approaches are further discovered. Its significance lies in the fact that this study has caused us to think: is it only the difference of the response of the AI system based on API design in the foreground or the difference of LLM in the background? This is not only a problem of data science (mainly in form), but also a problem of smart system studied (including form and content, its existence principle and construction method) just like by using the STEAM. Looking back at the examples of how two software AI systems face the research topic of human beings, it is of great significance for many years of experimental results recorded in Chinese, English reporting and bilingual thinking.

***Keywords:*** Big Data; Human-Computer Mutual Assistance; Data Science; Smart System Studied; Seven Time Pass; Three Ring Interaction

## 1. Main text

This paper aims to further explore the innovative practice of smart education guided by the theory of smart system studied as Rongzhixue, that is, the research on the three-ring interaction man-machine cooperation education mode assisted by repeating seven times to pass just like by using the STEAM seven-time-pass for big data with AI, and for that the application of the three-ring interaction man-machine cooperation education mode based on the seven-time-pass method namely repeating seven times to pass.And than optimize the teaching of English for Chinese

students from the perspective of data science, in particular, to explore the teaching strategies of tonal misreading and lack of understanding of English way of thinking and its western culture for Chinese learners from high school.The results show that in the era of big data and artificial intelligence, not only teaching English for Chinese students, but also all aspects of the whole education and teaching strategy need to be re-explored.This study adopts three groups of control studies closely related but harmonious and different.Among them, it includes not only the traditional rule-based expert knowledge system, but also big data processing based on statistics, machine learning and deep learning, a new generation of AI and even primary general artificial intelligence, such as GPT and LLM.[1-8]

Three groups of closely related but harmonious but different places as the nomenclatures are the formal expression tools of the foundation of this smart system studied for the Research on the *Educational Mode of Three-Ring Interaction Man-Machine Cooperation Based on Seven-Time-Pass* with Eight Person-Group methods as e.g.:

**Nomenclature**

A. Repeat seven times in various ways both narrow and broad sense, referred to as the **Seven-Time-Pass** method;
B. A series of eight individuals for the man-machine cooperation, abbreviated as the **Eight Person-Group** method;
C. Three Learning+Three Guidance+Three Examinations = **Three Cyclic Interactions** or **Three-Ring Interaction**.

## 2. Methods

The method is to adopt three groups of comparative studies, namely, man-machine mutual assistance and interpersonal mutual assistance, including personal self-help. What is a seven-time-pass? The responses of the two software AI systems are completely different. This has caused us to think: Is it just the difference between the responses of the human-computer interaction software AI system designed based on API in the foreground, or the difference between its LLM in the background? This is not only a problem for data science (mainly in form) but also for smart system (including form and content, its existence principle and construction method) just like by using the STEAM. The following is the examples of how two software AI systems face this research topic:

### *2.1. The first group of human-computer dialogue results（Xiaohui Zou and ChatGPT4 by Time-saving technology）*

**People ask question**: Research on the educational mode of "three-ring interaction" man-machine cooperation based on "seven-time-pass"

**Machine answer** (artificial intelligence system gives generalized experience): I'm very sorry that I can't provide you with the research on "seven-time-pass", "three-ring interaction" and education mode. I suggest you consult relevant academic resources or consult educational experts for more detailed information.

### *2.2. The second group of man-machine conversation results（Xiaohui Zou and Chatbot by JKTChat）*

**People ask question**:Research on the educational mode of "three-ring interaction" man-machine cooperation based on "seven-time-pass"

**Machine answer** (artificial intelligence system gives generalized experience): The research object of the man-machine cooperation mode of "three-ring interaction" based on "seven times pass" is education. The research purpose of this model is to explore how to achieve efficient educational effect through man-machine cooperation.

Specifically, this mode includes seven steps:

1. Design curriculum: Teachers need to design curriculum content suitable for students' abilities and interests.
2. Developing teaching materials: Teachers need to use the latest teaching materials, including gamification teaching materials, multimedia teaching materials and interactive teaching materials.
3. Testing and evaluation: Teachers need to test and evaluate students to determine their learning level and learning results.
4. Implement man-machine cooperation: Teachers need to combine students with computer programs and game-based learning software to realize man-machine cooperation.

5. Encourage students: Teachers need to design incentives to encourage students to complete their learning tasks.

6. Evaluate students' learning effect: Teachers need to evaluate students' learning effect to determine whether they have mastered the course content.

7. Update and improvement: Teachers need to update and improve the education mode according to students' learning situation and evaluation results.

The education mode of "three-ring interaction" based on "seven time poss" can help teachers improve students' learning effect.


Fig. 1. (a) first picture is Zou with ChatGPT4by Time-saving technology; (b) second picture is Zou with Chatbot by JKTChat.

Based on the experimental results of the above two human-computer dialogues, the following basic analysis can be made: firstly, it can be seen that the general strategies of the two design and production teams are completely different, one is passively avoiding problems; The other actively answers questions (as to how much of his answer meets the meaning of the question, or satisfies the questioner or can be recognized to what extent? That is a problem that anyone will encounter in the process of further active exploration). This is the most fundamental difference between the responses of the human-computer interaction HCI software AI system based on API design in the foreground. Further, it can be seen that there are at least two situations in which two foreground softwares use background LLM, either directly adopting the GPT and LLM of OpenAI, or using the GPT independently copied by open source software or using other LLM, but as far as we know, at least they using the corresponding LLM.

This is not only a preliminary analysis and judgment from data science (mainly from the form) but also from smart system science (from the form and content, the principle of its existence and the method of its construction). Among them, the problems that need further study. In-depth study can be made from interpersonal, man-machine and inter-machine (between machines) separately or even in combination. Let's compare the above two examples of human-computer interaction and even cooperation and mutual assistance to see how individuals and interpersonal people think, understand and deal with the same topic or theme:

### *2.3. The third group is the self-questioning and self-answering（Wu in Chinese and Zou in English or in both）*

**Question:** Research on the educational mode of "three-ring interaction" man-machine cooperation based on "seven-time-pass"

**Answer:***.2.3.0.[Abstract]* The man-machine cooperation education mode discussed in this paper is based on students as the main body, information technology as the auxiliary, building knowledge and thinking graphs as the foundation, and stimulating students' learning motivation as the premise; Combining with the characteristics of the subject and integrating the ideological and political education of the course, we should implement the large-scale network teaching activities of double-subjectivity man-machine cooperation to improve the academic performance and realize the five-round education.*[Keywords]* seven-pass; three-ring interactive; human-computer collaboration

*2.3.1.[Introduction]*There are 57 students in Class 3, Grade 2020 in Shuangyashan No.1 Middle School, Heilongjiang Province. Under the dual situation of three-year epidemic and large-unit teaching under the background of "four innovations", the teaching design method of human-computer interaction based on "seven-time-

pass" and "eight-person group" was implemented [9], adopting the online group of "eight person group" and integrating the online teaching mode of "three-ring interaction" [10], and achieved good results in English subjects. The practice and experience are summarized as follows.

*2.3.2.[Text]First, a brief introduction to the theories of "seven time pass" and "eight-person group"*

(A) the core theory: "seven time pass", "eight person group" and "three-ring interaction"

According to the theory of financial intelligence, to master and understand the knowledge points of a certain subject knowledge module, we must follow the "seven-time-pass" and "eight-person group" [11]

"**Seven-time-pass**" has many meanings, such as: seven-time-pass for Chinese and foreign languages teaching and learning: listening, speaking, reading, writing, translating, describing and commenting; For skills training and skills pass through seven times: understanding, knowing how to do that, being familiar, being skillful, using, dividing and combining; Seven time passes of subject knowledge: diagram, outline, line, block, base, point and topic; The time distribution is seven times: morning, noon, evening, night, going to school, going to class,going to the library; The space distribution is seven times: bed, stool, table, window, platform, corridor and courtyard; The teaching process goes through seven times: guidance, introduction, learning, thinking, practice, examination and evaluation. Improve the efficiency and quality of learning through the compound use of various seven-time-pass methods. In addition, the seven-time pass distribution of time and space also conforms to China's proposal of promoting the digitalization of education, expanding the coverage of "everyone can learn", broadening the spatial breadth of "learning everywhere" and extending the time scale of "learning all the time", so as to build an open, flexible and sustainable learning society that meets the lifelong learning needs of the whole people and build a learning society and a learning country with lifelong learning for all. [12]

"**Eight-person group**" refers to the grouping of students in a class into several study groups. If there are too many people or too few people, the learning efficiency is not good, and it is appropriate to have about eight people. At the same time, students in each group should have high or low grades, so that students with good grades can help students with poor grades. Through the establishment of groups, students in each group can conduct pre-school self-study and discussion and review after class.Here, the author of Rong Zhi Xue, Xiaohui Zou emphasized many times in his series of courses that there are many matters that should be paid attention to when understanding social animals, education, psychology, management, organization, society and other aspects of research results are combined across borders. Therefore, based on Rongzhixue and its application scenarios, a series of eight -person-group have too many application scenarios and a series of specific constraints that can be changed in the actual operation process (they need to be specially trained deliberately and involve the 10,000-hour law of mastering skills).

The teaching and learning methods of "seven-time-pass" and "eight-person group" can not only be used for offline teaching, but also be carried out under the network environment. It consists of three stages: students' self-study (autonomous learning before class, multimedia learning and group cooperation learning), teachers' guidance (collectivization, individualization and group learning) and knowledge module (classroom test, homework test and paper test). Its teaching modules are interrelated, mutually motivated and complementary. Among them, learning guidance is a very important link in the teaching process. Through learning guidance, students can master a certain knowledge module from point to line, from line to surface, and from surface to body, which is a gradual and deep learning process. It can be seen that the driving force between the three rings is "the resultant force of students' autonomous learning ability and teachers' guiding ability" [13]. (B) Other auxiliary theories: We often use Bruner's "cognition-discovery theory" teaching thought, Zankov's development teaching theory and cooperative learning theory in online class, but in the process of man-machine cooperation teaching, we use a lot of network hypertext reading theory, Dale's "tower of experience" audition theory, Wennei's information processing theory, Holmberg's two-way communication theory and Keegan's re-integration theory of teaching and learning in distance teaching. (C) Ideological and political integration in the curriculum: In the course of ideological and political education, we have made a bold innovation, and adopted the "triangular pyramid" collaborative education model to carry out "five-round education". This model is composed of a large group three-ring and an individual three-ring and formed through its unique internal change law, and its framework has the characteristics of all-round, multiple, compound and interactive co-frequency resonance.

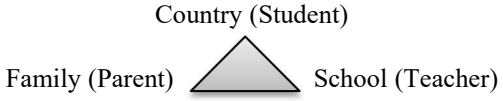

Fig. 2. (a) Family,Parent; (b) Country,Student; (c) School,Teacher.

The establishment of this "triangular pyramid" collaborative education model can solve the problems of uneven cognition, unclear goals, single form or fragmentation in the process of education, and form an all-round multi-component interactive co-frequency resonance network architecture with vertical and horizontal interweaving, mutual integration and mutual promotion, and linkage education. The "group big three rings" in the framework of its double "three-ring interaction" collaborative education system is composed of three groups: family, school and country, in which family is further generalized to be composed of "three relatives", which refers to relatives with blood relationship, relatives arising from marriage relationship, and relatives who are sworn according to certain folk customs without blood relationship or marriage relationship; "Three Tong" refers to classmates, colleagues and fellow villagers. "Individual Small Three Rings" is composed of teachers, students, parents or guardians. The tetrahedron formed by the triangular pyramid model for educating people is composed of ideological and political courses and party activities, study style construction and goal guidance, career planning and employment guidance, life assistance and behavioral norms. So that the education giver and the educated can be interrelated, mutually motivated and complementary, and then achieve "three knowledge", that is, those who are bound by kindness are called bosom friends; Those who are intimate with each other are called intimate; Those who seek harmony with each other are called bosom friends; And then form a close relationship of beauty, beauty, beauty and harmony. [14] can also be carried out through ordinal logic and linkage function.

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*2.3.3.Second, the specific operation methods*

(A) First of all, understand what skills and skills are. The essence of understanding, knowing, being familiar, being skillful, using, dividing and combining where understanding, knowing, being familiar, being skillful, using correspond to learn, think, practice, realize, gain. Only by learning can you understand, and learning must think about sorting out and grasping the key problems and solutions. Only by learning and understanding, you need to practice more. Through practice, you can sublimate to the level that practice makes perfect. Clever is an enlightenment, and you can achieve a certain goal in many ways rather than a single way. Use is to get, get knowledge or a skill skill method. Division and integration are innovation, reclassification and integration. (B) Secondly, we should be able to use subject knowledge for seven times. The essence of the seven time passes of subject knowledge lies in the mind graph which has been published (*see orcid 0000-0002-5577-8245*, as *2-drawing, 2-outline, 2-line, 2-block, 3-base, 3-point and 3-topic,so it is omitted*) .

First of all, teachers need to let students grasp two diagrams and two outlines. "Two diagrams" are knowledge books and mind graphs; The "two outlines" is the catalogue of each course. Each unit in the catalogue is the outline, and the title of the outline is the key point. The section divided under each unit is the detailed outline, and the detailed outline is the difficulty. Secondly, the "three basics" (that is, basic concepts, basic principles and basic methods) in the detailed outline are sorted out by mind graph, and students can further master the three basics

through "three questions" (examples explained, exercises in training and examination questions) and "two lines" (main lines and auxiliary lines), and understand and digest the three points (key points, difficulties and blind spots) to achieve understanding thoroughly, not just simply memorize. Thirdly, teachers should let students know the order and position of knowledge blocks in the knowledge graph. Knowledge block is very important, which plays a role in occupying the ordinal logic of knowledge. Order is time sequence, time is linear, bit is position, and it is marked in space. This is related to students' ability to quickly understand the knowledge points of various subjects, especially geography and biology, history and politics, so that students can get twice the result with half the effort in the learning process.

From the above, we can see that each course is like a room in a knowledge palace, and each unit is a big block in the knowledge module. Every "three basics" is a small piece in a big block, which is the infrastructure of the "seven-time-pass" knowledge palace space. This architecture, when combined with collaborative intelligent computing system, will fully mobilize students' diligence, eagerness to learn and joy to learn.[15]（已发表故省略 Fig. 3-4.）

*2.3.4.Finally, teachers should be familiar with the teaching process for seven times.*

Structure of "three-ring interaction" teaching process model:

Teacher: Guide ------Enlighten or lead ------ Comments

Machine: Creating Situation------Auxiliary Analysis------Practice Test and Evaluation

Student: Study ------ Practice ------ Test.

Teachers and students are both subjects------evaluation

Three-ring interactive teaching process, based on the seven-time-pass teaching process, teacher's operation steps: First of all, according to the goal of large-scale teaching task, design the teaching steps such as integrated teaching content, situational curriculum activities, curriculum interaction and exchange process, practice test and evaluation; On the basis of in-depth study and analysis of curriculum standards and textbooks, from the perspective of students, the man-machine interactive curriculum design is carried out from a higher angle. Then, the teaching process is realized by using synchronous live broadcast of a two-way video conference system and asynchronous playback of streaming media, individual counseling, network group discussion, network resource information search and processing, etc., and at the same time, it is necessary to patrol the problems that appear in the answering process of each group of students and give them random guidance. Finally, through the practice of the same type of topic with increased difficulty, the observed problems are summarized and analyzed, and the mistakes and their reasons are pointed out; Learn without omission or doubt. Promote students' mastery and application of what they have learned. Summary of experience: Through three years of teaching and learning experience between teachers and students, we realize that: The "machine" in this teaching mode is the abbreviation of modern educational information technology [16], as a teaching medium, is not only a tool for assisting teaching, but also a cognitive tool for students' autonomous learning. It takes part in the teaching process with different functional emphases and becomes an integral part of it. "Machine" is used by teachers to create situations in the teaching process and as a cognitive tool for students' active learning and collaborative exploration. Through human-computer interaction, it provides favorable conditions for students to perceive and understand. Through self-regulation and feedback control, students' creative thinking is stimulated, and students are encouraged to actively think, explore and discover more, thus promoting their active development.

The "interaction" in this teaching mode refers to the function and communication in the whole teaching process. It includes communication between teachers and students and computers. Teaching information is transmitted in many directions and acts on the other side. The subject of this teaching mode is people, which determines the combination of each module in the teaching mode. Compared with people, educational technology plays an auxiliary role, and its role in the mode depends on its auxiliary level in teaching. The subject of teaching activities is student, who is the undertaker, initiator and defender of learning activities, and both teachers and machines play the role of assisting students.

It can be seen from the above that this man-machine collaborative teaching mode is based on cognitive learning theory and pays attention to the optimal development of students' psychological intelligence. It takes students as the main body and teachers as the leading factor, and implements subjective teaching. Give full play to students' own quality and intelligence, and publicize their independence, reflection and innovation. It embodies the student-centered consciousness, permeates the subject characteristics, takes stimulating learning motivation as the premise, takes knowledge structure as the foundation, takes thinking training as the center, organically integrates modern

educational technology, strengthens the coordination of information transmission and organs, and focuses on cultivating students' innovative spirit and practical ability. It is a new teaching and learning model that focuses on optimizing students' learning literacy.

*2.3.5.Fourth, student performance*

In the three academic years from 2020 to 2023, the overall quality of the whole class (53 students) was Grade A (33 students in the control class were A, 12 students in B, 1 student in C, and 1 student was unqualified), among which the average score of the whole class in 2020-2021 was 97.29 (67.21 in the control class) and that in 2021-2022 was 96.42 (69.43 in the control class),and that in 2022-2023, the average score of the whole class was 102.19 (82.33 in the control class). [17 ] From the data comparison of the figures, it can be seen that this man-machine collaborative education mode has its unique advantages in improving students' academic performance and educating people in all aspects. Existing shortcomings: 1. Traditional teachers and students live in the same physical space, but online teachers and students belong to different physical spaces of separation and aggregation of teachers and students. Although we have adopted the "triangular pyramid" model (see picture 2) to do a good job of co-education between home and school, rather than a simple and rude unified requirement, there is still a feeling of "powerless" to the living space where students live. 2. Online teaching still follows the linear logic of "preset teaching objectives-teaching selection and organizing learning activities-evaluating learning results", but students are faced with double pressure and anxiety from teachers and operating techniques. In addition, the parents who had retired to the second line had to play the role of supporters and monitors because of the characteristics of online teaching embedded in private space. 3. The auxiliary experience of virtual reality technology tells us that schools and teachers should think more about how to embed the dual subjectivity of teachers and students in curriculum design, how to use technology to open a variety of online interaction methods, and how to let students strengthen their self-expression and develop their personality while absorbing curriculum knowledge. 4. In the process of "creating situation" in the teaching process, the situation projection provided by computers and the Internet through eight forms of "word, form, picture, table, sound, image, three-dimensional and living body" has aroused students' interest in learning [18]. It is more vivid and real, can arouse students' interest more easily, and is more helpful to stimulate and cultivate students' active learning ability, which is incomparable to paper textbooks, but it needs further integration due to the limitation of information technology.

## 3. Results and Conclusion

The result is that, not only the responses of the two software AI systems are completely different, but also the comparative advantages of the three research approaches are further discovered.

Its significance lies in the fact that this study has caused us to think: is it only the difference of the response of the AI system based on API design in the foreground or the difference of LLM in the background? This is not only a problem of data science (mainly in form), but also a problem of smart system studied (including form and content, its existence principle and construction method) just like by using the STEAM. Looking back at the examples of how two software AI systems face the research topic of human beings, it is of great significance for many years of experimental results recorded in Chinese, English reporting and bilingual thinking. What needs to be emphasized is the third group, which is not so much the practice of interpersonal interaction as an attempt to improve the existing education and teaching practice in the era of man-machine mutual assistance.

Actively redesign the teaching mode and scene based on information technology, empower education with information technology, and fully embrace the information technology represented by the Internet for education. Man-machine interactive teaching and learning is no longer just an auxiliary means, but has a significant impact on the teaching process from the premise and basic level. Reflecting on the gains and losses of three-year online teaching practice, modern educational information technology gives students the initiative to learn and is good at stimulating and mobilizing students' enthusiasm for learning; Can care for and cultivate students' curiosity and thirst for knowledge in teaching; Make learning more interesting, simpler and more effective; It can help students to study and think independently, protect students' exploration spirit and innovative thinking, and enable students to surpass teachers' teaching, make discoveries and innovate; Creating a relaxed environment for the full development of students' endowment and potential provides a paradigm for the transformation from "industrialized education" to

"intelligent education" in the future, and the realization of large-scale standardized education with human-computer cooperation to large-scale personalized learning.[19]

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