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A Study on How AI-enabled Immersive Situation Creation Promotes Primary School Students' Writing

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Abstract

The new curriculum standard points out that Chinese learning should take place in real life situations. Writing is a key way for students to express themselves, and it is also an important and difficult part of Chinese teaching. At present, primary school writing classes have many common problems. The situations created in class are simple and disconnected. Students cannot fully get involved in learning. There is no effective support for interactive activities, and many students do not know what to write. This study takes AI-enabled immersive situation creation as the starting point, and analyzes its internal working mechanism to improve primary school students' writing ability. Considering the creative nature of writing, this paper explains how AI-enabled immersive situation creation rebuilds the writing environment from three aspects: activating life experience, building meaning and making dynamic adjustments. This study also sets up the AI-SIF Model, namely AI-powered Immersive Situation-Interaction-Feedback Model. The model has three core parts: intelligent situation building, human-computer interaction and real-time feedback and adjustment. The three parts work together to form a complete support system. It can provide learning contexts, help students finish writing and improve the whole learning process. Based on the AI-SIF Model, this paper puts forward some suggestions for teaching practice. First, teachers should put situation design in the first place and focus on the whole learning process and creative results. Second, classroom interaction should encourage participation of all members, produce new ideas and drive deep learning. Third, teachers need to take new roles as designers, guides and regulators.

Keywords: AI Empowerment; Immersive Situation Creation; Primary School Students' Writing; AI-SIF Model

1. Introduction

Against the background of deep integration between information technology and education, basic education is undergoing an overall shift from knowledge teaching to ability development. Chinese courses play a key role in helping students use language and form good thinking skills. Their teaching quality directly affects students' overall abilities. Writing teaching is both an important part and a long standing difficulty in Chinese education.

The 2022 Compulsory Education Chinese Curriculum Standard clearly states that Chinese learning should take place in real life situations. It points out that learning needs to come from daily life and help solve real problems (Wang & Zhang, 2023). However, most situations designed in primary school writing classes are just superficial. Students often have nothing to write about, gain shallow experience and fail to get fully involved. Writing teaching also faces common problems such as general guidance, delayed feedback and lack of personalized support (Peng, 2025). When teachers check and revise articles, they spend much time and energy. Their advice often fails to target specific problems, and evaluation standards are too subjective. These problems create room for artificial intelligence to assist teaching.

With the rapid development of artificial intelligence, great changes have taken place in the education field. Generative AI performs well in creating ideas, organizing language and carrying out complex communication (Yan et al., 2025). It can make personalized writing situations and help students get fully immersed in virtual real scenes. It also keeps the situation running through the whole writing process with real time talk and feedback.

Yan et al. (2025) put forward a complete theoretical system for AI supported immersive learning in 2025. After sorting out the meaning and basic parts of immersive learning environments, they built a practical model for generative AI. This model can set learning plans, create various learning materials, design situations and provide personalized interaction by dividing scenes, summing up rules and producing new content.

AI can not only create personalized writing situations, but also act as smart learning partners. Gu and Hao (2025) found in their 2025 study that generative AI works well in helping students write and develop advanced thinking. Smart partners offer advice and tips during writing. They effectively help students come up with creative ideas and achieve better learning results. Zhao et al. (2025) discovered in 2025 that AI agents use opening remarks and open questions. They raise inspiring ideas based on students' daily life and talk with students from different angles. This method greatly improves students' writing ability. Chen and Zheng (2025) sorted out the ways to use generative AI in writing teaching in 2025. They proved that AI offers great help before writing, during communication and in the revision stage. Luo et al. (2024) showed how generative AI can help teachers write comments on students' articles in 2024.

In recent years, research on AI assisted writing teaching has made great progress. Studies on generative AI, multi agent technology and immersive learning bring new ideas to primary school writing teaching. Even so, most studies only focus on either AI writing tools or immersive learning. Few researches combine AI supported situation design with primary school writing practice. There

is also not enough study on how AI creates learning situations and how it improves students' writing ability.

Specifically, the main problems of current studies fall into three points as follows.

First, situation, interaction and feedback are separated from one another. Existing studies only focus on one single part. Some researchers only study how AI creates learning situations. Some only look at AI scoring and feedback for writing. Others treat human-computer dialogue as an independent research step. However, primary school students' writing is a complete process. It includes feeling situations, forming ideas, organizing language and revising texts. Situation, interaction and feedback need to form a connected closed loop. Only this whole system can effectively help students build and improve their writing ability.

Second, there are no special models designed for the special features of primary school writing. Primary students have clear age-based learning features. Their cognitive development is moving from the concrete operational stage to the formal operational stage. They heavily rely on direct, lively and interactive learning situations. Their language ability is still in the early developing period, so they need gradual scaffolding support. Besides, they cannot keep focused or stay motivated for a long time. They need timely positive feedback to keep willing to write. Most existing AI education models are made for general use and do not fully fit these special needs of young students.

Third, two common troubles in primary writing teaching have not been solved systematically. The two troubles are that students can finish writing articles but cannot revise them well, and they can feel inner feelings but cannot express them clearly on paper. Students gain the wish to write when they stay in rich learning situations, but they lack practical ways to turn inner feelings into written words. After they finish writing, they also cannot watch their own writing problems or make revisions by themselves. For this reason, we need to add interactive writing scaffolds and ongoing feedback systems after building learning situations.

To solve the above problems, this study focuses on how AI enabled immersive situations improve primary school students' writing. It aims to explain the inner working rules and build a practical teaching model with solid theoretical support.

First, this paper analyzes the shortcomings of traditional situation design in writing classes and how AI can make changes. Second, based on the nature of writing creation, it explains how immersive situations rebuilt by AI improve writing from three sides. These sides include activating past experience, building ideas and adjusting writing content. Third, this study sets up the AI-powered Immersive Situation Interaction Feedback Model, namely the AI-SIF Model. It explains the meaning and working rules of the three core parts. Finally, it discusses what this model means for teaching design, class communication and teachers' roles.

The main findings of this study are as follows. First, AI enabled immersive situation design is not just simple technical addition. The three parts including intelligent situation creation, human AI interaction and real time feedback work together. They form a complete system to provide learning contexts, help finish writing and improve works step by step.

Second, the AI-SIF Model shows the rules of writing improvement. Activating experience is the starting point of writing. Building ideas is the main process. Real time adjustment ensures better writing quality.

Third, this model requires new ways of teaching. Teaching design should put situations first, focus on the whole learning process and accept new changes in class. Class communication should involve more participants, create new ideas and encourage full participation. Teachers need to take new roles as designers, guides and regulators.

These results provide a complete theoretical system and practical methods for AI assisted primary school writing teaching. They have value for both theory and practice. They help information technology integrate deeply into Chinese education and support students to express true thoughts and develop overall abilities.

2. Practical Problems of Traditional Writing Situation Creation and Changes Brought by AI

For a long time, writing teaching in primary school Chinese has been a difficult part in Chinese education (Li, 2026). The idea of situation-based teaching is widely accepted. Teachers know that this method creates writing tasks with clear topics, writing goals, target readers and writing styles. Students learn in real communication settings and understand why they write, who they write for and how they write. In this way, writing knowledge can turn into useful and transferable skills (Sun & Zhang, 2016). Students can also get direct emotional experience, so their interest and willingness to express themselves will grow (Zhang, 2023). However, traditional classroom teaching is limited by resources, technology, ideas and teaching methods. Situation creation fails to fully inspire students' desire to write and creative ability.

2.1. Limits in Resources and Dynamic Development of Traditional Situations

Traditional writing situations mainly depend on teachers' personal experience, verbal description and simple materials such as pictures, real objects and videos. All these materials can only be shown in one direction and bring obvious shortcomings.

First, the types of resources are too simple. Teachers cannot offer multi-sensory, dynamic and interactive materials. Students can only get a shallow understanding of the situations and fail to form full and deep impressions. Second, traditional situations cannot be updated flexibly. Teachers cannot change or add new content according to students' real-time responses and personal needs. If students show interest in certain details, teachers cannot immediately add related background information, pictures or dialogues. The situations lack room for expansion and new content. As a result, most traditional situations are just fixed settings instead of active spaces for interaction and exploration.

Different from traditional ways, AI can create new situations in real time based on teaching progress, students' interests and learning levels (Zhu et al., 2025). Such dynamic situations enrich the ways of content presentation. They can also match students' personal interests and learning levels. AI can keep the whole class surrounded by proper situations all the time so that students stay focused. Some schools even provide each student with an AI learning partner. Every student can

experience unique situations. In this way, AI creates different learning environments for different students (Zhu et al., 2025).

2.2. Traditional Classrooms Fail to Bring Deep Immersive Experience

Good writing requires students to fully get involved in given situations and gain real personal feelings. Traditional classrooms mainly use verbal explanations and simple activities to create situations. This way cannot break the limits of time and space. Students cannot truly enter historical scenes, natural views or imaginary worlds. Most of them just watch from the side or take part in activities in a shallow way. They need more direct and real experience to understand abstract ideas and share the same feelings with others (Yin et al., 2022). Traditional writing teaching cannot create a fully immersive learning environment. Students cannot get true and deep feelings. As a result, they find it hard to write vivid sentences that show real scenes and characters.

AI helps create better situations with virtual role play and first person view. It can also make new content during the learning process (Zhu et al., 2025). Students no longer just watch others' stories but experience everything on their own (Casas & Mitchell, 2024). They can talk with AI tools at any time. As the story goes on, they may feel nervous, excited, sad or happy. These rich feelings drive them to put their inner thoughts into words.

2.3. Traditional Writing Interaction Lacks Dynamic Support

Writing teaching is a changing process that needs timely feedback and adjustment according to students' performance. In traditional classes, interaction usually follows a fixed order. Teachers ask questions, students give answers and teachers make comments. Feedback comes late and only flows in one direction. Whether students can learn well largely depends on teachers' guidance. The communication between teachers and students decides the quality of the whole writing class.

Some classes let students judge each other's work to enrich interaction. However, the quality of students' comments still relies on teachers' guidance and examples. Students seldom have chances to carry out deep and personal communication with situations, classmates and written content. Effective learning needs constant communication, feedback, response and thinking building (Xie et al., 2016).

After AI is used in class situation design, a new multi-way communication form appears among students, teachers and AI (Zhai et al., 2023). AI can help teachers lead the whole writing class (Yuan et al., 2025). It can join group discussions or work as a personal writing partner for each student (Kong et al., 2025). It helps turn simple human communication into diverse joint interaction in writing classes.

2.4. The Problem of Having Nothing to Write in Traditional Writing

Many primary school students have long been troubled by the problem of having nothing to write. This problem mainly comes from three aspects. Traditional teaching separates students' daily experience from writing topics. It fails to develop their imagination and improve their ability to collect and organize writing materials (Lu, 2017).

On one hand, exam-oriented teaching pays too much attention to writing skills. It does not guide students to observe life and collect true feelings. On the other hand, students do not have proper tools and methods to recall memories, develop ideas and organize thoughts when facing writing tasks. Traditional teaching cannot offer clear and systematic methods to help students come up with ideas, arrange materials and keep writing (Wang, 2026).

Besides, traditional teaching only judges students' writing ability by their final articles. This way of assessment often makes both teachers and students feel discouraged. AI creates personalized immersive situations. It can add relevant experience for students based on what they already know in conversations (Zhu et al., 2025). It also records students' thinking, doubts and writing outlines during communication. It gives instant and targeted advice when students meet problems (Zhu et al., 2025).

In continuous immersive situations, students adjust their ideas and polish articles again and again until they finish the work. Teachers can check students' final works through the AI system. They can also find out where students get stuck and what parts they have changed. Assessment no longer only focuses on final articles. It keeps track of the whole writing process. In this way, teaching, learning and assessment are closely connected as a complete system.

3. The Working Logic of AI-enabled Immersive Situation Creation in Improving Primary School Students' Writing

To figure out whether AI-enabled immersive situation creation can really help primary school students write better, we first need to understand the nature of writing. We also need to see what changes this new way brings to students' writing.

3.1. The Generative Nature of Writing

Writing is more than just putting words and sentences together. It is a complex process. People turn their inner experience, feelings and thoughts into organized language that follows common rules. Its core is to create personal meaning (Riehm et al., 1992). First, students need rich and clear experience to start writing. Second, they need to sort out these materials, set logical connections and choose proper writing styles. Third, strong inner drive and true feelings push students to keep writing and try to show unique ideas. Finally, students need to check, judge and change their content, structure and language according to readers and writing rules. As a process of creating personal meaning, writing depends on three main conditions.

3.1.1. Writing Starts with Activated Experience

Writing begins when people bring up their past experience. Experience is the basic material for people to start writing. Without such materials, people cannot write anything. Students can gain experience from real activities, learn from others or create ideas based on past memories (Guckes, 1986).

Every student has a collection of life stories, reading knowledge and emotional memories. When they get a writing task, their mind will pick out related experience to use as writing materials. For

example, when writing about spring, students will recall what they see, hear and smell in spring, along with related happy or sad feelings. If students cannot bring up useful experience, they will have nothing to write. Their articles will be empty or full of made-up content. So rich and usable experience forms the basic support for writing.

3.1.2. Writing Relies on Full Engagement in Situations

The content, depth and feelings of writing are greatly influenced by situations. Real or simulated situations can draw students in. They will share feelings, think differently and have the desire to write. Learning theories also regard situations as necessary for students to build real understanding.

For example, when students act out the talk between mother and child in a story, they can truly feel the deep love of mothers. Then they can write more detailed and sincere content. The more deeply students join in the situation, the stronger their feelings and thinking will be. This provides more power and content for writing (Xie et al., 2016).

3.1.3. Writing Relies on Communication and Joint Creation

People do not finish writing alone. They exchange ideas, correct mistakes and improve works through social communication. Related learning theories point out that learning takes place in interaction with others.

During writing, students discuss, ask questions and work with teachers and classmates. Their original ideas get tested, widened and improved (Ding, 2020). For example, when group members talk about writing ideas, different opinions can bring new thoughts. Advice from partners helps students find problems in their work. Such communication plays an important part in building ideas (Zhu, 2023). In this way, writing turns from individual thinking into a result created together in group activities.

3.2. Explanation of AI-enabled Immersive Situation Creation

AI-enabled immersive situation creation is not just a way to make classes more fun. It reshapes the whole learning environment for writing. This method is based on constructivist learning theory and situated cognition theory. It holds that learning is a process where people build understanding through active communication in certain situations. It is hard for teachers to create truly immersive situations in traditional classes. To achieve immersion, students need to keep their full attention. The activities should also arouse their interest, curiosity and emotional connection. Students take part in activities out of joy and a desire to explore. This is the key to long and deep engagement (Tao & Fan, 2021). Studies show that virtual or enhanced environments with sights, sounds and even touch can help students get more immersed (Ma, 2024). Such interactive environments turn students from onlookers into active participants, which is important to keep their engagement (Yang & Zhang, 2021). However, most situations in traditional classes are static, broken and lack interaction. Teaching often moves away from the set situations. Students can only feel part of the scene briefly and keep switching between joining in and stepping out.

3.2.1. Immersive Situation Creation

Immersive situation creation means more than just setting up situations in teaching. It puts great emphasis on the state of immersion. The word immersion originally means going into water. It describes the state of being fully involved in a certain atmosphere or thinking. It stresses a sense of integration.

Students are no longer just observers. They devote their feelings and use all senses to interact with the language environment. In this way, the gap between textbooks and real life is removed, and they enter a fully integrated mental state. In this state, students feel like they are right in the scene. They focus fully, feel satisfied and even lose track of time. Therefore, the situations for writing classes should not be just empty forms. They need to follow the rules of reality, true feelings and beauty. Teachers should create virtual but realistic scenes. These scenes help students finish writing with full mental and cognitive engagement. To be specific, the situations should be lively, close to daily life and easy to join in. Students can put their heart into them and have deep communication with written content, story characters, teachers and themselves.

3.2.2. AI applied in Writing Teaching

AI acts as a major tool in writing teaching. It is fully combined with the whole teaching process to improve teaching quality and help students write better. AI mainly works in three ways in writing classes. First, it can create learning situations intelligently. It builds realistic scenes and breaks the space limits of traditional classrooms. Second, it supports joint learning between humans and AI. Real time communication between students and AI forms a new learning mode. Students can experience immersive interaction with the help of all senses (Yan et al., 2025). Third, it provides instant feedback and adjustment. AI watches students' performance all the time. It offers timely guidance when students meet difficulties and keeps them active in learning (Wang, 2024).

3.2.3. AI-enabled Immersive Situation Creation

To build immersive situations, AI needs to create realistic scenes first. Then continuous interaction between students and AI helps students move from simple observation to deep emotional involvement. At last, real time feedback from AI guides students to change and improve their writing (Tran, 2024).

Different from traditional fixed, one-way and static situations, AI-enabled immersive situation creation is a dynamic learning system. It relies on AI technology and works through three connected parts, namely intelligent situation building, human and AI interaction as well as real time feedback and adjustment. The system keeps students active and responsive so that their writing skills can be improved. Common AI tools only serve as simple helpers. By contrast, the core value of AI-enabled immersive situation creation is to break the limits of teachers in time, space, thinking and quick response. The continuous immersive situations make interaction and timely feedback work better, and finally help students improve their writing ability.

3.3. AI-enabled Immersive Situation Creation Reshapes the Writing Environment

AI-enabled immersive situation creation replaces the static situations in traditional classrooms with dynamic and continuous ones. These situations can be extended and revisited, and they

accompany students through the whole writing process. Students can enter the same situation many times to observe and experience from different views, so they get new ideas and content to write about. Writing becomes a continuous communication with the situation. One draft is just a start. With new feedback and experience, students can revise, enrich and improve their writing again and again. In this repeated process, students not only master writing skills, but also develop abilities such as observation, empathy, logical thinking and creative problem solving. These abilities lay a solid foundation for good writing. Overall, AI-enabled immersive situation creation reshapes writing from three aspects, namely experience activation, meaning building and process adjustment.

3.3.1. Reshape Experience Activation: the Situational Foundation of Writing

AI creates interactive and life-like situations with various forms of content. Students take part in the activities and gain real experience instead of just watching. VR and AR technology can build vivid three dimensional scenes. Students can feel as if they are present at historical events, natural wonders or scenes from literary works, even if they cannot visit these places in real life.

This immersive experience works on students' sight, hearing and other senses. Physical involvement further drives deep thinking and emotional engagement. It brings back clear memories and true feelings related to writing topics. For abstract or imaginative themes, generative AI can turn students' words into pictures and videos quickly. This way of recreating scenes helps students form clear ideas and makes up for the lack of real life experience. With learning analysis technology, AI can learn about students' interests and knowledge level. When students experience the situations, the system will recommend related materials, sample articles and other resources. It helps students connect new experience with old knowledge, understand the situations better and collect more personal writing materials. AI provides students with real and tangible experience. It turns abstract writing themes into specific feelings and details, so students will no longer write empty content.

3.3.2. Reshape Meaning Building: the Interactive Process of Writing

The nature of writing is to create meaning through constant communication with situations, materials and target readers. AI acts as a smart partner and dialogue mate in the whole process. It turns writing from a simple final task into an active and social thinking activity.

Immersive situations designed by AI contain clear story lines and logic. While exploring situations and finishing tasks, students will find problems, analyze causes and effects and sort out ideas under AI's guidance. They naturally form a clear thinking framework based on the situations and build logical structures for articles on their own. Students no longer learn writing rules from textbooks passively. They form their own thinking habits and write in a more organized way. Students can keep immersed in situations by talking with AI, playing different roles and writing together. This also helps them get through difficult points during writing. The interaction between students and AI shows the whole thinking process of writing. AI raises questions to help students add more content. It gives logical tips to arrange sentences and paragraphs. With timely responses, students can turn vague thoughts into clear and well organized language.

3.3.3. Reshape Dynamic Adjustment: the Supporting System for Writing Improvement

In AI-powered immersive situations, writing goes along with interaction and feedback. AI offers real time comments, detailed analysis and personalized learning plans to adjust and improve writing all the time.

AI can create virtual characters to check students' articles right away. It points out mistakes and gives advice for improvement from different sides. Revising articles is no longer just a boring check of words. It becomes part of creating and polishing ideas. Evaluation runs through the whole writing process. Students can change their writing methods in time. In this way, teaching focus shifts from final results to the whole learning process. For students who feel nervous about writing, AI provides more useful guidance and encouraging words. For students with better writing skills, AI puts forward open and challenging questions. This kind of support on both thinking and emotion keeps students motivated and helps them form a positive attitude towards writing (Zhao et al., 2025). To sum up, AI-enabled immersive situation creation turns a single and separate writing task into a repeated, updatable process with timely feedback. It helps students make their writing more delicate and proper.

4. Model Construction of AI-enabled Immersive Situation Creation for Improving Primary School Students' Writing

On the basis of the above content, this paper builds the AI-powered Immersive Situation – Interaction – Feedback Model, namely the AI-SIF Model. It explores effective ways to improve primary school students' writing ability. This model has three core parts including intelligent situation generation, human-computer interaction and real-time feedback and adjustment. They form a three-part system to support students to finish and polish writing works. The AI-SIF Model is a dynamic teaching system developed from AI-enabled immersive situation creation. Its three components work on experience accumulation, cognitive thinking and writing improvement. They let students stay in personalized writing situations all the time and effectively help them write better.

4.1. Meanings of the Three Core Parts of S-I-F

In the AI-SIF Model, intelligent situation generation helps students gain rich experience and arouse their feelings and learning motivation. Human-computer interaction improves students' thinking modes. Real-time feedback and adjustment solves problems in writing polishing. The three parts cooperate with each other. They form a complete system that provides learning contexts, helps produce writing content and optimizes the whole writing process.

4.1.1. Intelligent Situation Generation (S): System for Activating Writing Experience

Intelligent situation generation is the starting part of the whole model. It combines various forms of information to create clear and tangible learning contexts. It meets students' need for real writing materials and answers the basic question of what to write.

This part uses texts, pictures, videos and virtual characters to build immersive learning environments. AI can provide each student with a dedicated learning partner according to their age,

interests and existing knowledge. It also changes the difficulty and display ways of situations to match students' learning levels. For example, it creates quiet observation scenes for shy students and challenging exploration tasks for students who love adventures. When writing about history, the future, tiny worlds or classic literary works, students usually lack related experience. AI can create corresponding scenes to broaden their horizons and offer plenty of ideas for imaginative writing (Gu & Hao, 2025). Apart from supplying writing materials, this part activates students' past experience and true feelings. It turns abstract writing tasks into real wishes to share ideas and builds practical contexts for writing.

4.1.2. Human-Computer Interaction (I): System For Building Writing Ideas

Human-computer interaction is the core part for idea building in the model. In AI-created situations, students keep communicating and working with AI tools, virtual characters, environmental elements and learning partners. This process helps students form better thinking habits and produce writing content. It solves the problem of how to plan and organize articles.

Generative AI offers interactive support during the whole writing process. Before writing, it raises guiding questions and holds idea-sharing activities to help students decide writing themes and choose proper materials. While writing, it stays in the same situation and asks further questions about certain paragraphs. It also suggests adding more details or using different expressions to help students clear up and deepen their thoughts (Chen & Zheng, 2025). This kind of communication works like one-on-one tutoring. It carries out communication and cooperation which are important parts of constructivist learning theories. AI can also create virtual figures such as historical people and story roles. Students can act in different roles or have discussions with them to get new writing ideas. Besides plain words, AI allows students to combine writing with picture making, audio recording and video editing. They can make picture books, audio stories or short cartoons. In this mixed creation process, students need to arrange words and other media properly. It not only inspires their creativity, but also helps them understand and express ideas in different ways.

4.1.3. Real-Time Feedback and Adjustment (F): System for Improving Writing Quality

Real-time feedback and adjustment is the controlling part of the model. Within immersive situations, AI collects and analyzes students' words and actions right away. It gives targeted comments and guidance to help students improve their writing. It deals with the problem of how to revise and polish articles.

On a basic level, AI finds grammar and word mistakes in students' speeches or drafts and offers different ways to correct them. On a middle level, it checks the logic, details and emotional expression of writing and makes clear analysis reports (Chen & Zheng, 2025). On a general level, AI adjusts the difficulty of later situations, the challenge of tasks and the focus of feedback according to students' overall performance. It makes personalized learning plans and keeps tasks suitable for students' current ability. Multi-level, timely and continuous feedback supports students throughout the whole writing process. With process reminders, result comments and detailed revision advice, AI corrects improper expressions and improves writing quality in immersive situations. Students can revise their works many times with accurate and systematic guidance.

4.2. Operating Mechanism of the AI-SIF Model

The AI-SIF Model is a non-linear system. Its three core parts work together and keep changing in cycles. In teaching steps, the model follows the order of situation generation, interaction and feedback adjustment. But in actual use, the three parts influence one another in reverse and keep improving through repeated cycles.

When AI gives comments or revision advice, these contents will start a new round of interaction. Students will change their way of communication and polish their writing. They will also rethink and understand the original situation from new angles, and gain unique experience. Besides, AI can change the difficulty and details of situations or add new content according to students' real performance. It makes proper arrangements for each student when they meet difficulties or show strong interest. The detailed operating rules are as follows.

4.2.1. Situation-Driven Mechanism: The Starting Point of Writing Based on Activated Experience

This mechanism is the first step to help primary school students write well. AI creates vivid and realistic situations with various forms of content. Students can easily get involved and bring up their past experience and true feelings. It builds solid conditions and inner drive for writing. Students will clearly know why they write and where to start. It works in the following three ways.

(1) Multi-form situation input activates students' senses

AI collects and creates clear pictures, moving videos, background stories, virtual characters and sound effects. It builds a rich learning environment that students can see, hear, feel and take part in (Wu et al., 2025). For example, if the writing topic is exploring a rainforest, AI can show thick woods, play sounds of animals and describe the wet air. Rich sensory experience helps students form a full and clear impression of the writing object, and prepares them for further experience.

(2) Immersive experience brings back past experience

Students will take different roles in the situations, such as explorer, reporter or story hero. They no longer just watch but take part in all activities. This role play reminds them of similar life experience (Yan et al., 2025). For example, the scenes may remind them of forests they have visited or animals they have seen in zoos. Ideas from books and videos also connect with the writing topics. Students will believe that they have enough content to write about.

(3) Emotional involvement creates the desire to write

In immersive situations, students have different feelings as the story develops. They may feel nervous when exploring new places, curious when finding secrets, moved when helping others or proud when solving problems. These real feelings become strong inner drive. Students want to record and share their thoughts in words. In this way, writing changes from a task arranged by others into a willing choice from the heart.

The situation-driven mechanism is inspiring and experience-focused. It solves the common problem that students have nothing to write due to limited life experience and shallow perception

in traditional classes. Writing is no longer a rigid language task. It turns into a real experience with true feelings. It provides rich materials and strong emotional support for high-quality writing.

4.2.2. Interactive Generation Mechanism: Meaning Construction Based on Human-computer Cooperation

The situation-driven mechanism makes students willing to write. This interactive mechanism mainly helps students work out how to finish their writing. In immersive situations, students do not just receive information passively. They keep talking and interacting with AI and other elements in the situation. They understand the content better and build ideas and writing structures on their own (Zhao et al., 2025). The cooperation between students and AI keeps them fully involved. It helps them turn existing experience and feelings into complete ideas for writing.

(1) Build ideas through communication to enrich content

Students can ask AI questions whenever they get stuck while writing. For example, they may ask what special things are inside a cave, what the main character thinks or how the surroundings change when the weather turns bad. AI gives answers right away and adds plenty of details. Students can clear up their confusion and turn vague thoughts into clear writing materials. This helps them enrich their content in both range and depth.

(2) Experience different roles to set writing perspectives

Students interact with AI under certain roles in immersive situations. AI also creates suitable virtual characters to match the situation. This two-way role setting helps students form their own writing views. They feel like working with AI partners to finish tasks. For example, a student acting as an exploration leader will focus on team safety and route planning. AI can offer related experience and details for this role. If the student acts as a team scientist, he will pay more attention to plants, animals and new findings. AI can also provide professional knowledge in real time. When students take specific roles, they no longer look at everything as common onlookers. They think and write from the view of real participants with unique feelings and limited knowledge. This makes up for their lack of experience and helps them find proper ways and tones to tell stories.

(3) Create works together to improve writing ability

Students can work with AI to finish writing. When they have trouble moving on, AI can add more details, restore scenes, suggest different sentence patterns and writing examples, or offer ideas to continue the story. It guides students to feel the situation again and notice more details. This solves the problems in traditional writing classes, where students cannot write much or observe carefully because they only depend on unclear memories. Students do not simply copy the ideas from AI. They choose, change, combine and share different opinions. During this process, they organize thoughts and try various writing methods. Finally, they put scattered ideas into smooth articles.

The interactive generation mechanism is always changing and creating new content. Students do not finish their writing in one single step. Their articles take shape gradually after many rounds of thinking, trying and adjusting through communication with AI. The whole writing process becomes a clear journey to explore new ideas, and teachers can give help whenever needed.

4.2.3. Feedback and Adjustment Mechanism: Ways to Improve Writing with Dynamic Guidance

This mechanism ensures continuous improvement of writing quality and works through the whole writing process. AI offers timely and all-round guidance during writing. It provides personalized help all the time. In this way, students can keep improving their writing.

(1) Real-time tips for learning support

When students have trouble planning or writing articles, AI gives immediate tips. It offers advice on key words, article structure and writing skills. For example, it may tell students to describe people's movements and looks. It also asks questions about structure such as whether to explain the cause of an event next or use some comparisons to make the text more lively.AI turns general writing skills into simple and practical steps for different students. Every student gets suitable guidance (Wang et al., 2024). This makes writing easier and helps students finish their work smoothly.

(2) Comments on finished content to find problems

AI quickly checks completed paragraphs or first drafts from many sides including content, feelings, language and structure. It points out existing problems clearly. For example, it may say the scene description is detailed yet the writer can add more inner feelings of the character. It may also mention an attractive opening and suggest better links between paragraphs. Students can know exactly where their writing needs to be improved instead of just feeling unsatisfied. In traditional classes, teachers can only share a few students' works as examples for the whole class. Now every student can get exclusive comments from AI. The feedback and adjustment mechanism features instant reminders, constant revision, personalized help and steady progress. It solves the problem of delayed feedback in traditional teaching. AI gives help right when students need it most. Its advice is based on each student's own writing instead of fixed rules, so it is quite targeted. Evaluation and improvement go hand in hand. Students can see clear progress each time they write. Their writing ability and learning efficiency get greatly improved. To sum up, the AI-SIF Model forms a complete dynamic system to support the whole writing process with its three connected parts. As shown in the figure 1 below:

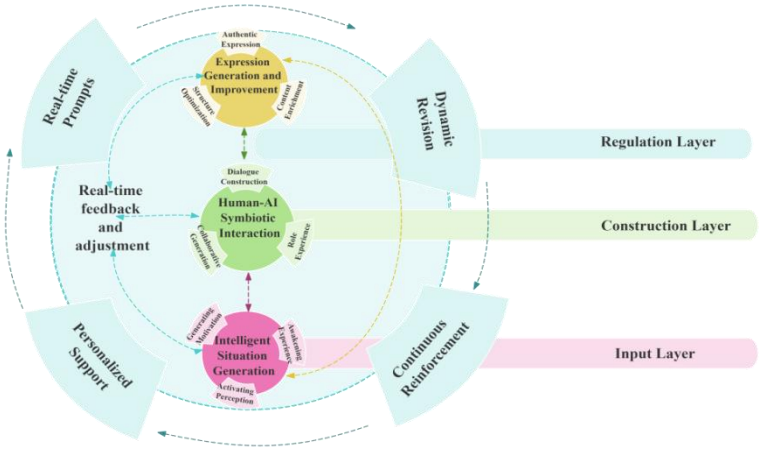

Figure 1. The Internal Relationship Diagram of the AI-SIF Model

In this model, AI-created situations bring back students' past experience and arouse their wish to write. Students finish the first version of writing through various communication with AI. The feedback system checks and improves the text in real time and helps students write better again and again. Finally, students can write richer content, better structure their articles and express their true thoughts. Writing is no longer a difficult and lonely task. It becomes an interesting experience full of exploration and growth in the smart learning environment.

5. Practical Implications of the AI-SIF Model

The intelligent situation generation part of the AI-SIF Model enriches students' experience and makes them willing to write. Human-computer interaction helps students improve their thinking and form logical writing ideas. Real-time feedback and adjustment optimizes writing methods and raises writing quality. As a dynamic system with three connected parts, the AI-SIF Model truly helps primary school students improve their writing skills. It brings the following ideas for primary school writing teaching.

5.1. Implications for Teaching Design

Traditional writing teaching design usually follows a fixed order. Teachers first explain knowledge, then analyze sample articles, and finally let students learn by imitation. This way assumes that students struggle with writing mainly because they lack related knowledge, such as writing skills and article structures. The AI-SIF Model shows the important value of situational experience, ongoing support and idea creation. It helps teaching design change in three major ways.

5.1.1. Put Situations in the First Place

The AI-SIF Model shows that meaningful writing does not come out of nowhere. It grows from rich and engaging learning situations. When students stay in real, complex and challenging situations, they will naturally want to express themselves and start writing.

When planning lessons, teachers should first design proper situations based on teaching goals. The situations need to carry key knowledge and arouse students' desire to explore. Teachers can use AI to create interactive spaces for students to explore and communicate. Then teachers set learning tasks around these situations (Chen & Shi, 2026). In this way, students can gain feelings and ideas before they start to write.

5.1.2. Focus on the Whole Learning Process

The AI-SIF Model tells us that deep communication among different participants can make students show their thinking clearly. AI acts as a partner to exchange ideas with students (Ye et al., 2025). It not only provides information, but also asks questions, gives tips and creates content together with students. This helps students organize thoughts and language. Writing is no longer a static task but a dynamic process to explore and share ideas. The cooperation between humans and AI helps students sort out ideas and form clear logic in writing (Chen & Zheng, 2025).

Teachers should pay more attention to students' thinking process when they interact with AI and classmates, instead of only caring about the final articles. They need to design a series of learning

activities for students to explore, try and correct mistakes, rather than just plan a single class. Teachers should work out key steps for communication between students and AI, and decide how students interact with AI. They should not only list simple writing steps.

5.1.3. Allow Dynamic Changes in Learning

The feedback part of the AI-SIF Model works all the time during learning. AI gives instant advice on word choice, grammar and article structure while students write (Chen & Zheng, 2025). With repeated feedback and revision, students keep improving their writing within their current ability level.

Teachers need to keep an eye on the problems found by AI during interaction. They can use AI to offer personal guidance for students with different needs. The use of AI allows cases, materials and even learning tasks to be created and updated continuously during classroom interaction (Chen & Shi, 2026). Teachers should not fix all teaching contents and steps in advance. Teaching design needs to be flexible enough to accept new useful content generated in class. Students can change story backgrounds, roles and plots with the help of AI.

5.2. Implications for Classroom Interaction

In traditional writing classes, most communication happens between teachers and students. Students seldom have in-depth exchanges with their classmates or learning materials. The AI-SIF Model features diverse and creative interaction. It offers new ideas to improve the overall communication environment in class.

5.2.1. Build Multi-Party Interaction

AI is introduced into writing classes and forms a new interaction mode among teachers, AI and students. More students can get instant and personal help. The traditional communication between teachers and students turns into a network where teachers, students and AI interact with one another. As an equal partner, AI keeps communicating with students patiently. This allows teachers to offer deeper guidance (Zhao et al., 2025).

Teachers should make good use of AI and design different interactive tasks. For example, students can discuss story endings with virtual AI roles or collect writing materials together in virtual spaces. This kind of multi-party interaction can greatly encourage students to write and help them think from different views.

5.2.2. Develop Generative Interaction

The AI-SIF Model holds that students' words can become new materials for further communication. Every description and dialogue from students will be recognized by AI and change the whole situation. Students are no longer just receivers. They create situations and texts together with AI. Interaction moves from simple information sharing to deeper idea exchange and creation (Feng et al., 2025).

Communication with AI helps students think differently and come up with new ideas. Students do not aim to get standard answers. They create new opinions and expressions by learning from each other. Teachers should value students' early drafts. They can use AI functions to continue

creating content based on students' words. The whole interaction process becomes a source of new writing ideas.

5.2.3. Promote Full Participation

Immersive situations and timely feedback make students think and feel more actively (Zhao et al., 2025). Students take part in writing through role play, problem solving and joint creation in AI-supported situations. They change from passive learners into people who experience scenes, solve problems and create ideas together. This in-depth participation makes writing more real and detailed.

Teachers should design more activities to let students fully join in the situations. Students can act as different roles and tell stories from their own views. For example, teachers can ask students to work as forest detectives and write observation notes, or act as seeds and describe their journeys. AI provides proper dialogues and environment details for different roles, so students can better understand their roles and express themselves naturally.

5.3. Implications for Teachers' Roles

The use of the AI-SIF Model in writing teaching does not reduce the importance of teachers. Instead, it sets higher and more complex requirements for teachers' professional roles. Teachers no longer mainly control the whole class. They become lesson designers and guides who lead students to form proper ideas during the learning process.

5.3.1. Designer

AI can create situations, but teachers need to connect these situations with writing goals. Teachers are no longer mainly responsible for giving knowledge. They become designers of learning experience (Chen & Shi, 2026). They need to master the skills of designing lessons with AI and work out proper teaching plans together with AI.

Teachers create interesting and challenging immersive situations for writing. They also plan the process of cooperation between students and AI as well as among classmates. They choose proper AI tools to help students learn. Besides, teachers need to make sure each situation matches certain writing training goals and avoid making activities too entertaining to ignore writing tasks.

5.3.2. Guide

When plenty of information and support are provided by AI, teachers play a more important role in guiding students to think and form right values. Teachers turn from knowledge givers into people who inspire students' thinking. They guide students to judge the content from AI and tell right information from wrong ones. Teachers organize group discussions to turn technical experience into better writing ability and thinking skills. They also care about students' feelings and moral ideas shown in writing and give proper guidance (Zhang et al., 2023).

Teachers need to learn how to raise good questions. For example, they may ask students which part of the AI-made scene they like best and why, or what will happen if the main character does not open a certain door. In this way, students learn to use AI in a rational way.

5.3.3. Regulator

Teachers manage and protect the whole learning environment. They check the interaction between students and AI to stop students from relying too much on technology or becoming lazy in thinking. Teachers control the speed and depth of human-computer interaction. They change task difficulty and teaching steps according to students' learning performance.

Based on AI feedback, teachers give warm and personal comments to encourage students and protect their privacy and learning interest (Chen & Shi, 2026). Teachers set clear rules and goals for using situations. For example, students spend the first fifteen minutes exploring and the next twenty minutes writing independently. Teachers reduce interaction with AI at proper time and let students write on their own. They also organize reflection activities to help students tell apart ideas from AI and their own thoughts, so students can gradually master writing skills. Teachers should use resources properly and make sure technology serves education (Yang, 2022).

6. A Teaching Design Case of Primary School Writing Based on the AI-SIF Model

Designed according to the cooperative three-part AI-SIF model, this lesson follows a dynamic repeating process: Situation creation (S), Interactive generation (I) and Feedback regulation (F). This study designs the lesson A Magical Adventure Trip from Unit Six, Volume Two for Grade Five students using textbooks compiled by the Ministry of Education. The AI multi-media technology builds immersive adventure scenes to wake up students' life and imagination experience and encourage them to write. Layered human-AI interaction helps students of different levels collect materials, set story views and finish articles. Real-time AI evaluation and learning supports offer targeted teaching for students at different levels. This method solves three common writing problems for primary students. These problems include having nothing to write, lacking detailed descriptions and writing similar stories.

This lesson fully carries out layered teaching. Students are divided into three groups. Group A students have weak writing skills. They cannot collect enough materials and write smooth sentences. Group B students have medium writing skills. They have basic ideas but their descriptions and plots are simple. Group C students have good writing skills. Their plots are complete but they lack specific details and true feelings. Different scene guides, human-AI communication and evaluation plans are prepared for each group throughout the whole class.

The teaching goals of this lesson are set as follows:

Use AI immersive scenes to open students' imagination of adventures and collect materials about scenes, actions, inner feelings and environment.

Finish writing with layered human-AI cooperation and master the structure of adventure stories. The structure includes environment introduction, unexpected troubles, self-rescue and concluding thoughts.

Improve writing details with real-time AI feedback and create adventure stories with logical plots, vivid descriptions and sincere feelings.

The complete teaching process of A Magical Adventure Trip based on the AI-SIF model is shown below.

6.1. Situation Creation (S): Lead In With Ai Immersive Scenes To Encourage Writing Willingness

Dear class, there are countless mysterious and wonderful places in our world. Deep tropical rainforests, secret underground caves and empty desert islands all hold unknown surprises and challenges. Today we will start our own magical adventure. Now please open the adventure scene on your pad. Watch the pictures and listen to sounds to walk into the deep rainforest.

6.1.1. Attract Students with Immersive AI Scenes

The AI system sends multi-media materials at the same time. Students watch moving pictures of thick rainforests and hear bird songs, stream sounds and rustling leaves. The screen shows thin fog, crossing vines and hidden caves. It builds a three-dimensional adventure world that students can see, hear and feel.

6.1.2. Assign Different Adventure Roles for Layered Guidance

Students choose their exclusive adventure roles according to their writing levels and join the adventure.

Group A (basic level): If you know nothing about rainforests and visit one for the first time, pick the AI partner Xiaoqi. Let it walk through the rainforest with you and help you feel this new world.

Group B (medium level): If you know a little about rainforests, pick the AI partner Xiaoyu and act as an adventure assistant. Carefully watch environmental changes and sudden problems around you.

Group C (advanced level): If you have rich knowledge about rainforests and show great interest, pick the AI partner Xiaolin and act as the adventure team leader. You need to watch the environment, make decisions, deal with dangers and take care of teammates.

Different scene introductions and AI partners match students of different levels and help them reach suitable learning goals. Group A students feel curious about AI pictures and sounds and get a simple idea that rainforests are thick and mysterious. Group B students stay focused on scenes and notice small details. They start to imagine possible dangers and form basic writing ideas. Group C students quickly take the role of team leaders. They think about possible troubles and team solutions and form rich imagination and writing willingness.

6.1.3. Summary of this Part

With the help of AI partners, all of us have entered the adventure world and felt the beauty of tropical rainforests. You must feel curious, nervous and excited right now. Today we will turn this magical trip into words and write down everything you see, hear, think and feel.

6.2. Interactive Generation (I): Layered human-AI Cooperation to Build Writing Content

6.2.1. Clear Core Rules of Real Adventures

Class, real adventures are not blind risks. They are planned challenges with clear purposes and full preparations. This trip lets you show your wisdom, courage and adaptability. To finish a perfect adventure story, you need to decide your destination, set your travel goal, build a reliable team, prepare necessary tools, plan possible dangers and think about self-rescue methods. We will follow the adventure plan step by step to create our own adventure stories.

6.2.2 Complete the Basic Adventure Plan Independently

The AI system sends electronic adventure plan forms to all students' devices. The form has five parts: travel goal, team members, carried tools, possible dangers and self-rescue ways. Related material explanations are also provided.

Students finish their plans with the help of AI partners according to their writing levels and talk with AI to polish ideas at any time.

Group A (basic): Choose simple travel goals, fixed teams, basic tools and one single danger to form a complete story structure.

Group B (medium): Match travel goals, team jobs and necessary tools properly. Plan one or two connected dangers and prepare matching self-rescue methods.

Group C (advanced): Match scenes, goals, teams, tools and dangers reasonably. Design connected troubles and gradual self-rescue steps to make the story full of real risks.

6.2.3. Share Plans in Class

Several students share their adventure plans. They talk about their travel goals, team members, tools, planned dangers and their reasons for these choices.

Teacher's comments: Most of you match scenes, teams, tools and dangers logically. Your stories will become more exciting if you add detailed processes of dangers and specific self-rescue steps.

6.2.4. Improve Story Ideas Through Human-AI Communication

(1) Build basic story frames

Combine your adventure plans to set your scene, wish, characters, tools, dangers and self-rescue steps and quickly finish your story outline. The AI sends reference scenes to support frame building. Meanwhile, the AI partner gives comments on your story ideas based on your outline.

(2) Share and discuss story outlines

Look at your first outline and AI comments. Think about these questions. Are your planned dangers reasonable? Are your self-rescue methods real and exciting? Can you create a thrilling and logical adventure story?

The AI sends special guiding questions for each group. It tells Group A to describe scenes and personal feelings when dangers happen. It tells Group B to add small changes to dangers instead of writing smooth trips. It tells Group C to improve self-rescue logic and add unexpected turns for real

plots. When students cannot continue writing, the AI offers extra scene information to help them rethink their story frames.

(3) Revise and add story details

We adjust our writing ideas to describe danger processes, perfect self-rescue steps and add unexpected changes. Then we rewrite our second outline to make stories more vivid and real. Group A students complete all outline parts and write simple descriptions of dangers and self-rescue. Group B students add small turns to dangers and describe clear actions and processes of self-rescue. Group C students design connected dangers and unexpected events, polish story logic and add character personalities and inner changes for attractive plots.

6.2.5. Fill in Detailed Content with Layered Human-AI Communication

Students have finished story frames but lack rich details, vivid descriptions and interesting plots. Different AI guiding ways are offered for three groups.

For Group A, the AI provides simple material questions to collect basic details. For example, what do you see when you walk into the cave? What does it look like when bats fly at you? What is your first reaction?

For Group B, the AI asks targeted questions about details. For example, what actions do you take when bats attack you? How do you feel when your lighter stops working? The AI also shares example sentences to describe actions and inner feelings.

For Group C, the AI guides deep thinking. For example, what do your careless cousin and biologist teammate do when facing dangers? How do your feelings change during the trip? What lessons do you learn from this dangerous adventure? It helps students create unique stories and lift the theme.

6.2.6. Finish Full Articles with Human-AI Cooperation

Now open your exclusive AI partner and start writing based on your adventure role. Talk with the AI whenever you meet difficulties and get special support. The AI partner offers proper guidance for common writing problems.

(1) Supply writing materials

If students only write simple sentences such as the rainforest is beautiful and mysterious without details or plots, the AI sends guiding questions to open imagination. For example, what do rainforest trees look like? What plants grow on the ground? What sounds do you hear when you walk into the rainforest? What sudden accident do you meet? Students collect simple materials following these questions and write basic environment descriptions and one dangerous event.

(2) Improve story details

If students have basic plots but general descriptions without actions or inner feelings, the AI asks targeted questions about details. For example, what do your hands and feet do when danger comes? Do you feel nervous, scared or calm? How does the surrounding environment change? The AI also

shares simple example sentences for descriptions. Students add action and inner feeling descriptions to form complete plots.

(3) Lift the story theme

If students write complete but similar stories without special views or sincere feelings, the AI guides personal creation and theme lifting. For example, as the team leader, how do you make decisions in danger? How do you work with teammates? What good qualities do you learn from this adventure?

Students discuss ideas with the AI instead of copying examples. They design unique unexpected events and express ideas about teamwork and bravery for creative stories.

6.3. Feedback Regulation (F): Real-time AI Monitoring and Layered Evaluation for Revision

6.3.1. Real-Time Learning Data Monitoring by AI During the Whole Class

Teachers check students' writing progress, sentence mistakes and weak points in material collection on the AI teaching platform. They master learning conditions of each group and offer targeted revision advice for writing improvement.

6.3.2. Layered Learning Supports From AI in the Writing Process

For sentence writing, the AI partner automatically corrects wrong characters and broken sentences. It reminds students to add simple environment descriptions and split long difficult sentences to reduce writing difficulty.

For detailed descriptions, the AI tells students to use writing skills, describe clear actions and inner feelings and connect paragraphs smoothly. It shares short sentences for revision.

For story structure and theme, the AI gives high-level advice such as adjusting story speed, enriching team interaction details and lifting the ending meaning.

6.3.3. Layered Evaluation Reports After Finishing First Drafts

After students finish their first articles, the AI automatically creates special evaluation reports from five parts: content, structure, language, feelings and details. Students revise their writing based on personal AI reports.

6.4. Class Summary and Homework Arrangement

6.4.1. Class Summary

Today we joined magical adventure scenes with AI partners and finished our own A Magical Adventure Trip with human-AI writing and accurate AI feedback. Many of you could not write anything at first, but now you can create wonderful stories. Writing is no longer a boring task but a wonderful personal experience.

6.4.2. Layered Homework

Group A: Read your full article, improve sentences following AI tips and copy the whole writing neatly.

Group B: Add one or two writing skills and more inner feeling descriptions to enrich story details.

Group C: Polish the whole article, lift your thoughts about the adventure and write unique openings and endings for excellent works.

This lesson fully carries out the repeating AI-SIF working process. The scene creation part solves students' low writing willingness and the problem of having nothing to write. The interactive generation part matches writing needs of students at different levels through layered human-AI communication and helps them build personal writing meanings. The feedback regulation part uses instant, layered AI supports and evaluations to fix two weaknesses of traditional writing teaching. The weaknesses are delayed feedback and the same standard for all students. These three parts form a positive repeating circle to teach students according to their abilities. Every student can improve writing skills based on their original level.

To sum up, the AI-SIF Model provides a complete theoretical framework and practical methods to explain how AI-enabled immersive situations improve primary school students' writing. Although this study builds the AI-SIF Model, it still has some limits. Further research is needed to carry out practical tests, think over related rules, improve teachers' ability and make the working mechanism more detailed. Now information technology and education are closely connected. It is still a long-term research task to make technology truly help students express themselves and improve overall ability.

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