Research on Generative Artificial Intelligence in Innovate Strategies of Teaching Interaction

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Abstract: In this modern era, effectively integrating artificial intelligence (AI) technology into classroom teaching interactions presents a novel challenge for many university educators. This paper begins by outlining the theoretical foundations of generative AI and teaching interaction. It then provides an analysis of the challenges that classroom teaching interactions face in today's context, along with the benefits that generative AI can offer to such interactions. Additionally, it examines the current state of generative AI applications in classroom teaching interactions and explores innovative strategies for leveraging generative AI in these settings. The aim is to provide valuable insights for enhancing the innovation and development of classroom teaching interactions in higher education institutions, thereby improving both the quality of classroom interactions and the overall learning experience for students.

Keywords: Generative artificial intelligence; Teaching interaction; Innovation strategies

1. Introduction

As artificial intelligence technology continues to advance and generative AI becomes increasingly integrated into daily life, the realm of higher education is experiencing significant transformations. Leveraging deep learning and natural language processing, generative AI can produce text, images, audio, video, and even instructional frameworks, offering boundless opportunities for enhancing interactive classroom teaching in universities. On one hand, generative AI can tailor educational content and interaction methods based on students' learning progress and requirements. This customized approach to teaching interaction plays a crucial role in fostering student engagement and improving overall classroom effectiveness. Moreover, generative AI assists educators by automating tasks such as grading assignments and creating personalized study plans, significantly reducing their workload. This allows teachers to allocate more time and effort toward enhancing the quality of their instruction. On the other hand, the integration of generative AI into classroom interactions introduces innovative concepts and methodologies for advancing university education. By incorporating this technology, traditional teaching models can be disrupted, encouraging the evolution of educational philosophies and teaching strategies. For instance,

generative AI can replicate real-world classroom scenarios and multi-role dynamics, providing educators with advanced tools for lesson preparation and pedagogical research. This proves especially beneficial for novice instructors, helping them navigate diverse educational contexts and content areas more effectively. Additionally, through collaborative learning experiences with generative AI tools, students are motivated to engage more actively in classroom activities, thereby strengthening their critical thinking and problem-solving skills.

2. Overview of generative artificial intelligence and teaching interaction

2.1. Basic overview of generative artificial intelligence

Generative artificial intelligence involves the creation of new content through automated learning, leveraging deep learning technologies such as neural networks and variational autoencoders. Upon receiving instructions, generative AI can mimic human creativity by composing music, creating art, or writing texts. By analyzing extensive datasets, generative AI is capable of predicting and generating novel content that satisfies specific criteria. Currently, the use of generative AI in education is expanding, particularly in fostering innovative teaching interactions. Through the integration of generative AI technologies, educators can develop more tailored learning materials for students, assist them in identifying personalized learning paths, and enhance the engagement and appeal of classroom instruction [1]. Technologies like Wen Xiaoyan, Chat GPT, IFlyspark, and Doubao contribute positively to improving classroom quality and supporting teachers in interactive teaching practices. With their support, instructors can better align teaching activities with curricula and plans, enabling more creative educational reforms. For instance, students can engage in contextual conversations with virtual characters produced by generative AI software to enhance their English proficiency and reinforce their comprehension and application of learned vocabulary and grammar concepts.

2.2. Theories related to teaching interaction

Teaching interaction plays a crucial role in the communication and collaboration among teachers and students, as well as among students themselves, within professional courses. Effective teaching interaction can not only successfully impart knowledge and skills to students but also strengthen emotional connections between teachers and students, as well as among students. This form of interaction encompasses not only instructors' guidance and feedback to students but also includes various aspects of students' active exploration and engagement in knowledge dialogues. In contemporary educational frameworks, teaching interaction is considered a pivotal element for enhancing learning efficiency, fostering deeper comprehension, and nurturing innovative capabilities. The primary features of teaching interaction include: First, teaching interaction is characterized by its interactivity. This involves a bidirectional or multidirectional communication process that encompasses not only instructors guiding students but also students providing feedback to instructors and engaging in discussions and collaborative activities among themselves. Second, teaching interaction exhibits a dynamic nature. It is not static, as the curriculum progresses and students' cognitive levels evolve, the methods, content, and goals of classroom interactions must be adjusted accordingly. Teachers need to design adaptable interactive activities that align with varying instructional themes and cater to students' learning needs. Third, teaching interaction is goal-oriented. All forms of interaction should support the achievement of educational objectives, whether these involve knowledge acquisition, skill development, or the cultivation of emotional attitudes. Interactive activities must remain focused on this central aim. Fourth, participation is a critical component of teaching interaction. Active involvement from students is essential. Each student plays a central role in the interaction process. Through questioning, discussion,

and practical exercises, teachers can facilitate an environment where students gain knowledge and enhance their competencies [2]. Fifth, effective teaching interaction takes diverse forms. Beyond traditional question-and-answer sessions, teachers can employ group discussions, case studies, role-playing, and other methods. The choice of interaction mode should be tailored to the specific teaching content to maximize effectiveness.

2.3. The impact of generative artificial intelligence on teaching interaction

Currently, numerous universities and colleges have incorporated generative AI into classroom interaction, leveraging it to enhance teaching content, methods, and evaluations, thereby improving the quality and effectiveness of classroom interactions. Regarding teaching content, generative AI serves as a robust tool for integrating educational resources, benefiting both instructors and students. Through generative AI software, they can swiftly locate essential teaching materials, including relevant English references, foreign visual resources, and diverse interactive classroom activities, which significantly contribute to enriching teaching content and boosting student engagement. In terms of teaching approaches, educators can utilize generative AI to facilitate interactive classroom instruction. This not only refines the traditional teacher-centered model but also enables the design of personalized interactive activities tailored to the actual learning needs of students. This type of personalized teaching approach not only fulfills the learning requirements of diverse students but also lessens the workload for teachers. Educators can leverage the instructional recommendations generated by AI to offer more precise support and direction to students, thereby enhancing the effectiveness of interactive classroom instruction. In terms of assessment, as opposed to traditional methods where teachers manually grade homework and tests, generative AI employs deep learning and natural language processing techniques to swiftly evaluate student responses and deliver accurate assessments. This reduces the burden on educators while increasing the efficiency and precision of evaluations. It allows students to promptly understand their academic standing and areas for improvement, enabling them to adjust their study plans accordingly. Furthermore, teachers can gain a broader and more precise insight into student learning through the evaluation data provided by generative AI, facilitating targeted focus in future classroom interactions to foster holistic student development.

3. The challenges of classroom teaching interaction in the new era
3.1. The form of classroom interaction is relatively simple

Traditional college classroom instruction frequently focuses on the transmission of knowledge while overlooking the importance of student engagement as active participants in the teaching process. To fulfill the teaching objectives within a restricted timeframe, instructors often assume a dominant role, guiding students who passively absorb information. This dynamic restricts the potential for meaningful interaction during lessons [3]. Moreover, with the widespread integration of internet technology into students' daily routines and studies, some learners find traditional question-and-answer interactions unengaging. If educators do not incorporate advanced tools like intelligent learning systems or online collaborative platforms, classroom exchanges may remain limited, resulting in low levels of student involvement. Additionally, certain experienced instructors tend to rely heavily on their established teaching practices and neglect acquiring skills related to interactive and smart classroom methodologies. Consequently, implementing varied interactive strategies to enhance and refine classroom instruction becomes challenging in practice.

3.2. Students' learning needs are increasingly personalized

As society continues to evolve, the demand for diverse talents across various industries has grown significantly. This diversity extends beyond professional skills to encompass critical thinking, innovation, teamwork, and numerous other competencies. Consequently, students today seek more than just traditional knowledge transfer in classrooms; they aspire to engage in a richer, more personalized learning experience that aligns with their future career aspirations [4]. Moreover, during classroom interactions, students desire individual attention from instructors, seeking tailored guidance and support to foster personal development. Additionally, the rapid advancement of information technology has introduced new possibilities for higher education. The integration of online teaching platforms, virtual labs, generative AI, and other technologies into classroom instruction allows students to access learning resources anytime and anywhere, promoting self-directed learning. However, this emphasis on student autonomy also presents new challenges for interactive teaching methods in the classroom.

3.3. Students have difficulty paying attention in class

In higher education, regardless of the specific course, college-level instruction tends to be more theoretical and abstract compared to high school. This increased complexity often makes it challenging for students to grasp the material, which can diminish their enthusiasm for learning and lead to a lack of focus during lectures [5]. Classroom interaction demands significant organizational skills from instructors. If teachers struggle to maintain effective classroom management or allow discipline to become lax, the quality of the learning environment suffers, ultimately reducing students' learning efficiency. Furthermore, the widespread use of social media platforms, particularly those featuring short-form content, has conditioned students to prefer fast-paced information delivery. As a result, even when class sessions last only a few dozen minutes, students may find it difficult to sustain their attention on interactive learning activities as required by the instructor. Additionally, some students possess weaker self-discipline and resilience. When faced with challenges in interactive classroom settings, they might hesitate to participate actively, fearing mistakes or poor performance. Consequently, their attention shifts elsewhere, further hindering their engagement in the learning process.

4. The application advantages of generative artificial intelligence in classroom teaching interaction

4.1. Assisting teachers to build high-quality interactive teaching classrooms

Leveraging the capabilities of generative artificial intelligence, such as intelligent algorithms and big data analysis, educators can effectively design classroom content, track student progress, and develop tailored learning plans. This technological integration significantly alleviates teachers' workload, allowing them more time and energy to concentrate on enhancing teaching quality and creating engaging, interactive classroom activities [6]. On one hand, generative AI can suggest teaching materials that align with students' learning preferences and skill levels by analyzing their historical learning behaviors. The availability of customized resources not only boosts students' interest in coursework but also encourages greater participation in classroom discussions. On the other hand, this technology can continuously monitor students' learning progress, promptly identify challenges they face, and relay insights to instructors. This empowers teachers to adapt their strategies dynamically, offering precise support to match the pace of diverse learners across various subjects. Consequently, students can actively engage in lively learning experiences, ensuring they comprehend and master the material through meaningful teacher-student interactions.

4.2. Promote students' active participation in classroom teaching interaction

The integration of generative AI into college education has introduced a fresh approach and technique for enhancing classroom interactions in higher education institutions, particularly in promoting student engagement. By leveraging generative AI technologies, instructors can develop more tailored learning strategies to cater to the diverse needs of students and motivate them to actively participate in classroom activities throughout their learning journey. For instance, building a robust English vocabulary has consistently been a critical challenge in college English instruction. To address the issue of insufficient vocabulary acquisition among students, educators can utilize generative AI software to supply students with word lists, enabling them to utilize the software for comprehension and memorization outside of class hours. Moreover, based on students' learning data, the software can suggest vocabulary practice materials and pacing that align with their learning capabilities and levels, ensuring that each student achieves optimal learning efficiency. Furthermore, generative AI can create virtual scenarios that mimic real-world environments, allowing students to study and explore within these simulated settings. Through this interactive method, students can experiment and correct errors in a stress-free atmosphere, thereby strengthening their understanding and practical application of the knowledge they have acquired.

4.3. Enhance the interaction and communication between teachers and students

By leveraging generative AI, educators can gain deeper insights into students' requirements during interactive lessons, adapt their teaching approaches, and enhance the overall learning experience for students. This AI-driven software can evaluate student feedback on interactive learning methods by considering their past academic performance and preferences, offering teachers recommendations on improving classroom engagement. For instance, by examining student participation levels, the system might advise which instructional techniques are most impactful or suggest optimal moments to introduce novel interaction styles to boost student motivation. In contrast to conventional classroom interactions, integrating generative AI can transcend temporal and spatial limitations. Educators can utilize technologies such as virtual reality (VR) and augmented reality (AR) to craft immersive educational settings, enabling students to engage with course materials and peers in a simulated context. Such interactions often encourage students to delve deeper into content through critical thinking and collaborative discussions. Furthermore, with the assistance of generative AI tools, teachers can develop game-based interactive learning activities that not only make classroom interactions more engaging but also foster students' collaborative skills and creative problem-solving abilities.

5. The application status of generative artificial intelligence in classroom teaching interaction

5.1. Personality tutoring and question answering

In university classroom interactions, instructors can leverage generative artificial intelligence to offer tailored tutoring and question-answering support based on each student's learning pace and comprehension skills. For instance, when students face uncertainties, they can consult the AI-powered teaching assistant for prompt and precise responses [7]. Moreover, generative AI can suggest suitable learning materials and practice exercises aligned with a student's progress and skill level. For example, it may provide foundational knowledge and problem-solving guidance for students who need reinforcement, while offering advanced and challenging content for those with higher proficiency. Additionally, generative AI possesses robust natural language processing capabilities, enabling it to swiftly interpret students' inquiries and deliver clear and accurate explanations. By

integrating contextual clues and logical reasoning, generative AI can provide deeper and more comprehensive analyses, thereby enhancing students' understanding of key concepts and fostering their analytical and critical-thinking skills.

5.2. Generation and integration of teaching resources

In university classroom instruction, educators can leverage generative artificial intelligence tools to create personalized classroom exercises, case studies, and experimental designs tailored to students' individual requirements based on the specific teaching content and their actual learning progress. This approach enhances the relevance and interactivity of classroom teaching. Generative AI possesses the capability to merge various data types, including text, images, audio, and video, enabling cross-format semantic analysis and transformation. This allows educators to convert dull textual material from textbooks into engaging resources such as images, videos, or even three-dimensional models, thereby making abstract theoretical concepts more tangible and interesting, which in turn boosts students' enthusiasm and engagement in classroom activities [8]. Furthermore, generative AI can effectively aggregate high-quality educational resources available on internet platforms, offering teachers and students a wide range of diverse teaching materials. By inputting keywords or describing the teaching content, instructors can swiftly access relevant micro-lesson videos or teaching cases, evaluate them, and integrate them into a resource library that aligns with the school's teaching objectives.

5.3. Classroom interaction and discussion

Generative AI can enhance classroom interaction through intelligent question answering, virtual assistants and other means. For instance, educators can incorporate interactive Q&A activities into their teaching plans, enabling students to engage with generative AI systems. This allows students to respond to questions posed by the AI or inquire further, fostering a relaxed and engaging learning environment. Moreover, generative AI can adapt the content and complexity of interactions based on students' learning pace and comprehension levels, encouraging broader participation in classroom discussions. Additionally, teachers can input the core themes of a lesson into the AI system to generate thought-provoking discussion topics, guiding students toward deeper analysis and collaborative group discussions. During these interactions, the AI can offer hints and recommendations to help clarify ideas, expand perspectives, and enhance both the depth and breadth of classroom discourse. Furthermore, as online education continues to grow, generative AI is becoming increasingly vital in supporting remote interactions and discussions [9]. By simulating face-to-face communication scenarios, AI systems can provide real-time voice, video, and text-based interaction capabilities. This enables meaningful engagement between students and teachers, even when they are not physically present in the same location.

5.4. Homework correction and evaluation

Generative AI offers a significant advancement over traditional methods of correcting computer-based homework, particularly for subjective tasks like English essays. Leveraging natural language processing (NLP) technology, this AI can swiftly and precisely detect grammatical mistakes, structural issues, and fluency concerns in students' essays, providing timely and accurate feedback [10]. This not only enhances the efficiency of grading but also lightens the teachers' workload, allowing them to allocate more time and resources to instructional planning and interactive teaching. Moreover, generative AI software supports multi-dimensional assessment of student assignments. For instance, when evaluating English compositions, it can analyze various aspects such as vocabulary usage, creative thinking, writing style, and emotional expression. This comprehensive evaluation

approach enables teachers to gain a deeper understanding of students' learning progress and areas needing improvement. Additionally, the software can offer personalized feedback and recommendations tailored to individual student needs. Students with moderate writing skills might receive focused guidance on grammar and syntax, while those with advanced abilities could get suggestions for enhancing content originality and depth.

5.5. Individualized learning path planning

Through the analysis and extraction of historical learning data, such as students' past academic performance, homework submission records, classroom participation, and online assessment results, generative AI is capable of identifying the unique learning traits and requirements of individual students. Leveraging deep learning algorithms, this technology can further design a customized learning trajectory for each student, taking into account their distinct characteristics and needs. In doing so, it respects students' personal learning preferences and styles while assisting them in discovering effective learning strategies [11]. Moreover, throughout the learning journey, generative AI systems can continuously adapt the nature and complexity of learning materials based on real-time feedback from students' academic progress and evaluation outcomes. For instance, if a student struggles with a particular concept, the system will introduce supplementary practice exercises to reinforce understanding. Conversely, for high-achieving students, the AI will suggest advanced and more complex content to further challenge and inspire their intellectual growth.

6. Innovative practice strategies for interactive classroom teaching with generative AI

6.1. Introduce generative AI to optimize the design and organization of teaching interaction

Classroom interaction primarily occurs through teacher questioning and group discussions, where the design of questions and discussion topics plays a key role. Integrating generative artificial intelligence tools can help align these questions and topics more closely with students' learning requirements while also increasing their complexity and engagement.

When it comes to classroom questioning, educators typically pose targeted queries to students based on the curriculum and practical applications, aiming to enhance students' grasp of classroom knowledge and improve their core competencies. However, teachers' experience and perspectives have limitations. To devise more effective and innovative questions for students, educators can input relevant keywords into generative artificial intelligence (AI) tools. This allows the AI to create question scenarios that align with the teaching material and the students' learning context, along with a series of logically structured and rigorous questions. Through engaging with these scenario-based problems and interacting with teachers, students can achieve a deeper understanding and mastery of the lesson content [12]. For instance, in a college English class aimed at enhancing students' understanding of Western cultural backgrounds, an educator could use generative AI to craft a short story about Christmas traditions. By analyzing the plot and dialogue within the story, students can gain insights into the relevant cultural context. In practice, to ensure that the generated content matches the learning level and cognitive abilities of college students, teachers should specify the learning objectives, course details, and thematic focus when providing prompts to the AI. This approach helps make the AI-generated stories more comprehensible and appropriate for the target audience. It is important to note that generative AI is not a one-size-fits-all solution. Teachers should engage in iterative dialogues with the AI, refining the storylines and adjusting the question designs to better meet the interactive needs of classroom instruction.

Regarding group discussion, teaching interaction typically occurs through teacher-student dialogue, group

discussions, and other components. Unlike traditional classroom questioning, group discussion focuses on themes or questions related to the teaching material posed by instructors. Students then analyze and discuss these in smaller groups. This process allows students to practice their communication and expression abilities, critical thinking, and teamwork skills through collaborative interaction. Additionally, through reflection and discussion, students can more effectively assimilate the knowledge they have acquired. For instance, in college English instruction, while covering oral communication topics, teachers could utilize generative artificial intelligence software like Wen Xiaoyan. By inputting the prompt "As a college instructor, please generate several topics appropriate for group discussion within the context of oral English teaching," the software, powered by big data models, would provide the following suggestions: (1) Campus life and cultural exchange. Encourage students to share engaging stories from their campus experiences in English and explore how individuals from diverse cultural backgrounds interact and adapt to each other's customs and values. (2) Professional development and language proficiency. Facilitate discussions among students about the significance of English skills in shaping future career paths and strategies for enhancing their English abilities to align with professional requirements. (3) Social media and relationship dynamics. Assist students in evaluating the influence of social media on personal connections and debating effective methods for establishing and sustaining positive relationships in digital environments. Allow students to select topics of interest for group deliberation, culminating in a collective presentation. Each group designates a spokesperson to deliver their findings. During this activity, teachers may incorporate the most popular topics chosen by students into generative AI tools for further exploration. By comparing the insights generated by the software with those of the students, educators can identify discrepancies, address gaps, and enrich the direction of student discussions.

6.2. Use generative artificial intelligence to innovate students' interactive classroom teaching activities

The application of generative artificial intelligence in innovating interactive classroom activities among students can be primarily seen in two phases: pre-class and in-class. Teachers can use generative artificial intelligence software to generate personalized preview questions according to students' learning level and interests. For example, when teaching grammar content, teachers can generate targeted grammar exercises for students with relatively weak English grammar foundation, and more challenging reading comprehension questions for students with a good vocabulary. With the help of personalized learning materials, we can meet the learning needs of different students and improve learning efficiency. At the same time, teachers can also use generative artificial intelligence software to directly design interactive gamified classroom activities by inputting corresponding prompt words. For example, under the instruction of the teacher, the generative AI software can design a word solitaire game for students that meets the learning level of college students [13]. Students use the online teaching platform to complete the game interaction. The software will randomly give a word related to the teaching content of the unit as a starting point, and students need to take turns to say the next word starting with the last letter of the word. The artificial intelligence assistant can immediately judge whether the word given by the students is correct and give the next word. Such preview activities can not only stimulate students' vocabulary memory and association ability, but also help to increase the interest and interaction of preview before class. This kind of interactive design not only reduces the technical difficulty of teachers' self-created preview tasks, but also improves the efficiency of using information-based teaching tools, so that students can complete the preliminary understanding of the learning content in the preview task of teaching through fun.

6.3. With the help of generative artificial intelligence, strengthen the interaction between students and learning content

With the extensive integration of information technology into education, generative artificial intelligence offers robust technical assistance for enhancing interactions between students and learning materials. It significantly contributes to students' development in English reading comprehension, English composition writing, and the enhancement of digital learning skills.

First, English reading comprehension serves as an important method for students to enhance their English skills. In conventional classroom settings, teachers typically guide students in translating passages and locating answers within the reading material by addressing specific questions. Despite numerous interactions between teachers and students during these activities, they often lack variety, and student engagement remains low. To address this, educators can incorporate generative artificial intelligence tools to create more engaging and creative English reading exercises. For instance, students could begin by thoroughly reading the text, identifying key details, and responding to questions posed by either the textbook or the teacher. Next, the text can be uploaded to generative AI software, which will independently answer the same questions based on the provided content. Students can then compare and evaluate the similarities and differences between their responses and those generated by the software. Should any uncertainties arise, students have the option to provide additional instructions or pose follow-up questions to the AI for further clarification. This approach not only strengthens students' critical thinking skills but also fosters their digital literacy.

Secondly, traditional English composition correction relied heavily on manual efforts from teachers. Given the large number of students, it was challenging for teachers to provide individualized feedback and guidance. However, generative artificial intelligence can address this issue to some extent. For instance, by establishing a set of procedures, teachers can train generative AI systems to develop basic skills in correcting and commenting on English essays, enabling direct interaction with students. Once students finish their English assignments, they upload them to the AI software. The software then performs personalized corrections and provides comments based on the teacher's predefined instructions. This not only helps in swiftly detecting spelling and grammar mistakes but also offers optimization suggestions regarding the overall structure and emotional expression of the compositions, thereby offering students more effective writing support. It is important to note that teachers should emphasize that generative AI tools are merely auxiliary learning aids. Students should not rely on these tools to directly generate compositions by inputting prompts. Additionally, students should not blindly accept all suggestions provided by the AI and should consult their teachers whenever they encounter uncertainties.

To enhance classroom interaction with students, teachers often prepare engaging visual, audio, and video teaching materials and presentations. Certain grammatical concepts can be challenging for students to grasp when explained solely through text. To address this, teachers can utilize software like Gatekeeperz to create instructional videos. This software can automatically generate a roughly 2-minute video based on the teacher's input, transforming abstract grammar rules into more tangible and understandable content, thereby aiding students in comprehension and mastery [14]. Additionally, generative AI tools can suggest practical application videos of grammar points according to the teacher's guidance, such as demonstrating fixed phrases in American TV shows. This allows students to better understand grammar usage through real-world contexts. Furthermore, students can independently explore how to apply generative AI in their English learning, turning it into an effective tool for mastering the language.

6.4. Improve the interactive feedback mechanism of classroom teaching through generative AI

Beyond helping teachers and students improve interaction and communication before and during class, generative AI can also perform detailed analyses of classroom interaction videos post-class. This assists teachers in efficiently completing their teaching tasks and identifying ways to enhance future teaching interactions. For instance, teachers can install cameras in suitable classroom locations to fully document teaching activities. Subsequently, AI tools like 360AI can be utilized to segment and evaluate different parts of the lesson, providing deeper insights into each segment's interactive dynamics. Additionally, teachers can leverage the software to produce automatic transcripts, using color coding or font distinctions to differentiate between teacher and student contributions. These materials can then serve as valuable resources for later teaching analysis and research.

To enhance the interactive feedback mechanism in classroom teaching, educators should leverage generative AI tools to comprehensively gather students' performance data. For instance, videos of classroom sessions can be uploaded to AI platforms with specific instructions to extract details about student participation, such as the frequency of contributions, the number of questions asked, and the duration of interactions. This information serves as a foundation for evaluating student engagement during lessons. Additionally, other learning metrics like homework completion rates, exam results, and resource usage logs can be integrated to create a holistic view of the learning journey. Subsequently, AI technologies can be employed to conduct in-depth analyses of this data, pinpoint gaps in students' knowledge frameworks, and forecast their learning trajectories. These insights enable teachers to offer tailored instructional recommendations, helping students identify their unique learning approaches while facilitating more effective teacher-student interactions. Moreover, generative AI systems can produce individualized learning reports for each student, allowing both learners and educators to gain insights into academic progress, grade distributions, and mastery of key concepts through data-driven analysis. Teachers can then adapt their teaching strategies and methodologies based on these reports to provide personalized learning support for every student.

Scientific and effective teaching feedback plays a crucial role in enhancing the quality of interactive classroom instruction. Educators should leverage generative artificial intelligence tools to promptly evaluate and provide comments on students' assignments and exams, thereby maximizing the impact of personalized feedback. AI not only swiftly grades student work but also identifies errors, offering detailed explanations and recommendations for improvement. Teachers can utilize these results to deliver targeted guidance and clarification to students. In traditional classrooms, tests often require teachers to grade or students to peer-review, consuming valuable class time. By employing artificial intelligence, educators can instantly analyze student responses and deliver individualized feedback and suggestions. Students, in turn, can adapt their learning approaches based on AI feedback to enhance their academic performance [15]. Furthermore, leveraging interactive classroom videos uploaded by educators and student learning data, generative AI can create customized learning paths for students. These paths assist students in defining their learning objectives, content, and pace. It is important to note that teachers should review the AI-generated plans, refine any impractical elements, and subsequently offer enhanced guidance and support to students. As students advance, instructors can direct the AI to periodically update the learning plans dynamically, ensuring students consistently meet their goals according to their individualized schedules. Throughout this process, teachers should configure the AI to provide timely incentives and encouragement based on student performance and progress, thereby boosting students' confidence and motivation. Additionally, teachers should engage in timely communication with students as prompted, offering emotional support and psychological counseling when necessary.

7. Conclusion

In conclusion, as an increasing number of educators incorporate generative artificial intelligence into their teaching practices, this technology has emerged as a crucial tool for facilitating classroom activities among college instructors. It offers substantial and varied support for educational processes. Nevertheless, practical implementation presents certain challenges. Educators must align with real-world learning scenarios, continuously enhance their digital teaching competencies, and effectively leverage generative AI to provide students with more diverse interactive experiences, thereby improving both the quality of instruction and student learning outcomes. In practice, teachers can utilize generative AI to refine the design and organization of interactions, introduce innovative peer-to-peer classroom activities, reinforce engagement between learners and content, and enhance feedback mechanisms within classroom dynamics. These strategies aim to fully harness the potential of generative AI to elevate teaching interactions. Additionally, when employing generative AI in education, instructors should ensure that the generated material possesses adequate depth and undergoes optimization and refinement to uncover further creative applications of this technology in interactive teaching contexts.

In the coming years, it is reasonable to anticipate that as artificial intelligence technology continues to advance and refine, generative AI will assume a more significant role within higher education. It will contribute more substantially to the development of interactive classrooms that are both more efficient and tailored to individual needs. Furthermore, this advancement will aid in nurturing college students who possess well-rounded qualities and are capable of thriving in the new era.

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References

[1] Yang H, 2024, Analysis on the Teaching Model of Generative Artificial Intelligence Integrated into College English Writing Classroom. College English, 2024(21): 3–5.

[2] Dong X, 2024, Exploring the Path of Enabling College English with Generative Artificial Intelligence. Zhang Jiang Science and Technology Review, 2024(4): 141–143.

[3] Yu G, Li F, Teng W, 2024, AI+ Education: The Upgrading and Transformation of Teaching Model in the Era of Artificial Intelligence. Ningxia Social Sciences, 2024(2): 191–198.

[4] Yang J, 2024, Deep Integration of Generative Artificial Intelligence and Higher Education: Scenarios, Risks and Suggestions. China Higher Education, 2024(5): 52–56.

[5] Li J, 2024, Classroom Teaching Innovation in the Era of Generative Artificial Intelligence. Information Technology

Education for Primary and Secondary Schools, 2024(Z1): 6–10.

[6] Kong L, 2024, The Application of Generative Artificial Intelligence in the Teaching of Foreign Language Majors: A Case Study of College Critical English Course – Intensive Reading. Frontiers in Foreign Language Education Research, 7(1): 11–18 + 90.

[7] Li S, Zheng L, 2019, Challenges and Responses of Generative Artificial Intelligence to Classroom Teaching. Curriculum. Materials. Teaching Methods, 44(1): 39–46.

[8] Lu Y, Li M, 2023, How Can Generative AI Empower Education? China Education Network, 2023(12): 79–80.

[9] Wang S, Wang Y, 2023, Design and Implementation of Classroom Learning Community Based on ChatGPT-Like Artificial Intelligence: From the Perspective of Dialogue Teaching Theory. Chinese Medical Education Technology, 37(4): 375–382.

[10] Li Y, Jin H, 2023, The Opportunities and Challenges Brought by the New Generation of Artificial Intelligence to Classroom Teaching in Universities. Education International Exchange, 2023(6): 26–29.

[11] Zhang S, Ma Z, Dong Y, et al., 2023, Why Is Personalized Learning in Large-Scale Classroom Enabled by Artificial Intelligence Possible? – Based on the Application Research of AI in Classroom Teaching in the Past Decade. Open Learning Research, 28(5): 42–50.

[12] Qu Y, Fei J, 2023, Reform of College Classroom Teaching Under the Background of Artificial Intelligence. China Adult Education, 2023(10): 47–49.

[13] Gan Q, Yu Q, Wang C, et al., 2023, Analysis, Research and Practice of Classroom Teaching Based on Artificial Intelligence. Software Guide, 22(1): 88–93.

[14] Liu B, 2022, The Core Value of AI Empowering Classroom Transformation: Intelligent Generation and Mode Innovation. Open Education Research, 28(4): 42–49.

[15] Wang L, 2022, Case Analysis of Interactive Teaching Innovation Model Based on Artificial Intelligence. Electronic Technology, 51(12): 46–48.