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The Application of ChatGPT in Economics Teaching: Scenarios, Deficiencies and Strategies

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Abstract

ChatGPT, as a large-scale language model, will profoundly influence and reshape the existing education and teaching model. This paper comprehensively analyzes the key technologies and core functions of ChatGPT and its application value in the education industry, and further emphasizes the unique advantages and potential value of ChatGPT in the teaching of economics courses. On this basis, the paper focuses on the application of ChatGPT in teaching, learning and evaluation of economics courses, and emphasizes several disadvantages of ChatGPT in education, including cheating and academic dishonesty, difficulty in ensuring the authenticity of answers, which may weaken students' self-learning ability, and challenges to the essence of education. In view of this, this paper puts forward countermeasures from two aspects of technology and system respectively: technically, we should improve the accuracy of the content and enhance the controllability of the application process; systemically, we should improve the mathematical intelligence of the educational subject and strengthen the academic normative management.

CCS Concepts

• Applied computing; • Education; • Computer-managed instruction;

Keywords

ChatGPT, Artificial Intelligence, Economics Course Teaching, Application Strategy

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1 Introduction and Technical Analysis of ChatGPT

ChatGPT is a large-scale language model. By learning a large amount of text data, ChatGPT can understand and analyze the structure and semantics of input information, and generates natural and smooth response text. Its key technologies include large-scale data training, deep learning, natural language processing, etc. Among them, large-scale data training is the basis of ChatGPT technology. Through large-scale text data training, ChatGPT can learn and understand the association and internal law between the input information, so as to better interpret and respond to the needs of users; In deep learning, ChatGPT utilizes deep neural networks to learn and understand the complex structure and semantics of input information, and outputs the correct answer for a given task; Natural language processing technology enables ChatGPT to understand and generate natural language in order to communicate effectively with users.(Zhang Junai, Liu Haijun,2024)

2 Core functions and educational value of ChatGPT

2.1 Language Analysis

ChatGPT uses deep neural networks to learn and understand the complex structure and semantics of input information, and has the ability of corpus learning and class understanding. It can accurately judge the topic, intention and logical relationship of the statement, and generate the answer that conforms to the logical semantics. In the field of education, the ability to interpret language is crucial to the realization of intelligent teaching and personalized learning. ChatGPT can analyze learning materials, summarize knowledge points, and help students quickly grasp learning points and carry out learning in a targeted way. The ability of language analysis can also be used to automatically correct homework, judge wrong answers and give correct explanations, so as to achieve intelligent assessment of learning effects.

2.2 Contextual Relevance

ChatGPT builds a huge knowledge graph in the process of training large-scale text data, enabling it to generate highly context-relevant response content by analyzing the context information of input content. At the same time, ChatGPT can continuously record the dialogue history, integrate the semantic information of the preceding and following sentences, perform multi-dimensional logical reasoning, judge the sequence and causal relationship between sentences, and generate contextual responses. For example, when learning a specific economic theory, ChatGPT can combine current economic

events and real-time data to conduct case analysis, apply the theory to the actual situation, help students better understand and use economic theory, and improve the practicability of theoretical learning.

2.3 Text generation

Text generation. Through large-scale text data training, ChatGPT has the most powerful general domain text generation ability. At the same time, ChatGPT also has the ability of class creation, which can generate large amounts of information and high quality content, which can assist the content output of all aspects of education and teaching. (Yang Haiyan, Li Tao, 2023) ChatGPT can help teachers efficiently generate syllabus, courseware, teaching plans, test papers, exercises, cases and other teaching materials, which can greatly reduce the teaching burden of teachers.

3 ChatGPT's unique advantages and potential value in the teaching of economics courses

Economics is a subject with both theory and practice. Traditional teaching is often faced with challenges such as abstractness of theory, complexity of data interpretation, lack of timeliness of cases, and difficulties in interdisciplinary integration. In view of the above problems, ChatGPT has unique advantages and potential value in the teaching of economics courses, which can significantly improve the teaching effect and learning experience.

3.1 Complex concept explanation

ChatGPT can describe abstract economic concepts and complex economic theories in plain language or intuitive graphics to help students better understand the concepts and principles of supply, demand, elasticity, utility, equilibrium, opportunity cost, and consumer choice.

3.2 Data interpretation and visualization

On the one hand, ChatGPT can interpret common economic data, such as GDP, CPI, unemployment rate, and inflation rate, and explain the economic meaning behind it. On the other hand, ChatGPT can provide data visualization services so that students can better observe and analyze economic data.

3.3 Case analysis and application

On the one hand, ChatGPT can conduct case analysis combined with current economic events and data to help students apply theory to practical situations and improve the practicability of learning. On the other hand, ChatGPT can provide examples of important economic events and policies in history to help students understand the practical application of economic theory.

3.4 Interdisciplinary integration

On the one hand, ChatGPT can combine economics with politics, management and sociology to help students analyze economic phenomena and solve economic problems from multiple perspectives and dimensions. On the other hand, ChatGPT can provide suggestions and guidance for students in interdisciplinary research projects and promote the improvement of comprehensive ability.

3.5 Interactive learning

On the one hand, ChatGPT can simulate conversations between economists, policy makers or entrepreneurs, helping students understand the economic decision-making process from different perspectives. On the other hand, through the role-playing interaction with ChatGPT, students can gain a deep understanding of the real economic activities running.

4 The Application of ChatGPT in Economics Teaching

4.1 Teaching: Using ChatGPT to create intelligent teaching scenes of economics courses

4.1.1 Smart lesson preparation with ChatGPT. Firstly, ChatGPT can help teachers enrich their teaching. The training process of ChatGPT includes the basic theoretical knowledge of economics, frontier development trends and the latest research results of economics, which can provide teachers with rich cutting-edge materials, enrich and update the teaching content, and make economics teaching more lively and interesting. Secondly, ChatGPT can help teachers prepare teaching materials efficiently. For example, the intelligent courseware making software can automatically generate interactive courseware according to the teacher's teaching content to improve the production efficiency and quality of teaching resources; Thirdly, ChatGPT can help teachers design a variety of teaching activities. For example, based on the teaching topic described by the teacher, ChatGPT can quickly design teaching activities such as case analysis, data analysis, answer discussion, and scenario simulation, and provide detailed and specific design schemes.

4.1.2 Use ChatGPT for intelligent teaching. In the teaching of economics courses, ChatGPT brings a variety of teaching methods, mainly reflected in the following three aspects: The first is intelligent assisted teaching. ChatGPT can act as a teaching assistant, randomly generate interactive games, and improve the interest of the class. At the same time, ChatGPT can reflect and analyze students' classroom performance and knowledge mastery, which helps teachers better understand students' learning situation and individual needs, and then teach in a targeted way. The second is virtual reality teaching. Through ChatGPT, students can role-play in virtual situations and experience the specific scenarios of economic cases. For example, when teaching the hypothesis of "human self-interest", in order to let students personally feel how the market economy operates in reality, ChatGPT is used to simulate how ordinary people such as vegetable sellers, sanitation workers, bus drivers, and breakfast shop owners integrate into the market economy, so as to bring students an immersive learning experience. Thirdly, practical operation of economic analysis. Economics is a data-based discipline, and ChatGPT is strong in data analysis and forecasting. When teaching the content "The Relationship between Unemployment rate and Inflation Rate", teachers can use ChatGPT to find the unemployment rate and inflation data of a specified country, automatically generate relevant charts, and ask students to summarize the relationship between unemployment rate and inflation rate based on chart analysis. (Huang Z, 2024)

4.2 Learning: Using ChatGPT to promote the transformation of students' learning style

On the one hand, expand the boundary of knowledge, extend the learning time and space. ChatGPT has sufficient knowledge reserve and the ability to understand feedback. Students can use ChatGPT to obtain the required economic knowledge and information anytime and anywhere, breaking the limitation of time and space in traditional learning. At the same time, ChatGPT helps to expand students' knowledge boundaries. For example, after learning the basic concepts and accounting methods of GDP, students can search the GDP data of the country or region they are interested in, the real GDP data per capita, and the relevant data of economic welfare (life expectancy, adult literacy rate, Internet penetration rate) according to their personal interests, and try to explore the relationship between GDP and economic welfare.

On the other hand, ChatGPT is used for interactive learning to improve learning efficiency. With the continuous and in-depth development of curriculum reform, interactive learning based on dialogue has become the teaching direction that people yearn for. GPT provides technical and environmental support for interactive learning. Teachers can use ChatGPT as a virtual tutor for students, encouraging students to engage in learning conversations with ChatGPT. For example, when teaching the content of "monetary policy", the teacher first introduced the concept of monetary policy and the three major tools of monetary policy, then asked the students "how the central bank uses the three major tools of open market business, legal reserve ratio and rediscount rate to regulate the money supply", and asked the students to discuss the questions raised by the teacher through dialogue with ChatGPT. Through dialogue, students can change from passive waiting to active learning, fully mobilize students' curiosity and thirst for knowledge, and fully understand what they have learned.

4.3 Evaluation: Reform teaching evaluation methods

4.3.1 ChatGPT can provide professional technical evaluation for teachers. Traditional teaching evaluation mainly comes from peer evaluation, supervision evaluation and student evaluation, but these modes are not frequent and subjective, and the effect of evaluation is not so good. ChatGPT, which has strong data processing and analysis ability, can conduct in-depth analysis on the teaching design and teaching implementation of economics courses, and give objective and fair evaluation. For example, ChatGPT can analyze teachers' teaching plans and provide targeted and rational suggestions for teachers by comparing with advanced teaching concepts and methods at home and abroad. Secondly, ChatGPT can also provide teachers with a large number of high-quality teaching case analysis, so that teachers can learn the teaching design and ideas of excellent teachers. In addition, teachers can also upload their own teaching materials such as syllabuses, lesson plans, courseware, exercises, and test papers to ChatGPT for review and revision from a professional perspective.

4.3.2 ChatGPT can provide students with real-time, personalized learning evaluation. At present, the evaluation of students' learning

effect of economics courses is mainly based on exams and assignments, and it takes teachers a lot of time and energy to grade papers and correct assignments, so it is difficult to give timely feedback to students' learning effect and take into account all the process growth of students. ChatGPT provides students with timely feedback through automated data analysis and evaluation. For example, ChatGPT can generate an evaluation report immediately after the completion of an economics course assignment, so that students can intuitively understand their learning status and existing problems. ChatGPT can provide students with personalized learning advice and tutoring materials in response to existing problems. For example, in view of students' weak points in the cost theory of microeconomics, we will push relevant explanatory videos, exercises and other materials. In addition, ChatGPT has the ability of system generation, can record and evaluate students' learning process, and can provide students with long-term learning planning and guidance.

5 The Shortcomings of ChatGPT In the Teaching Application of Economics Courses

5.1 Cheating and academic misconduct

At present, the assessment of economics courses mostly takes final exams, homework, course papers and so on. In addition, ChatGPT is increasingly used by students to write homework and essays, and it is difficult for teachers to tell whether the homework and essays submitted by students are generated by ChatGPT or completed by students themselves. ChatGPT provides a shortcut for obtaining answers and greatly facilitates the learning process. It is easy to become a tool for some students to opportunist, leading to lazy thinking and weakening their independent thinking ability.

5.2 The authenticity of the answers is difficult to guarantee

Firstly, ChatGPT relies on existing corpora. The range of existing corpus resources and data quality greatly limit the quality of answer generation. If the existing corpus contains wrong information or outdated knowledge, ChatGPT may generate inaccurate or misleading answers. As for the teaching content of economics courses, ChatGPT knowledge update has a time lag, and sometimes can not reflect the development trends of economics frontier and the latest research results of economics, so the accuracy and authenticity of the answers will be affected. Secondly, ChatGPT relies on the way questions are asked. Different prompts may produce completely different results, and the answers are less stable. Therefore, before asking questions, students should pay attention to the way of asking questions and try to describe the questions accurately.(Zheng Yanlin, Ren Weiwei, 2023)

5.3 Weakening students' independent learning ability

The core of education is to hope that students can master the ability of understanding cognition, dialectical thinking and logical reasoning through the study of specific content. As far as economics course learning is concerned, the high-level goal of teaching is to cultivate students' ability of logical reasoning, problem solving,

innovation and creativity. However, ChatGPT quickly presents answers in the form of hidden process, which deprives students of process learning and thinking training. In the long run, students are prone to form technical dependence and lose independent thinking ability and creativity. At the same time, due to the convenience of acquiring knowledge, students will reduce their worship for knowledge, gradually lose their thirst for knowledge and interest in learning, and appear to be inattentive in class and completely dependent on ChatGPT after class.

5.4 Challenge the nature of education

Education is essentially a "human relationship". When students rely too much on ChatGPT, it means that the desire for live human relationships is diminished. In the classroom teaching of economics courses, the communication between teachers and students and between students is an important part of classroom teaching. Through teachers' words and deeds, and support and connection with classmates, it is conducive to the formation of students' values such as humanistic care and social responsibility. If we over-rely on ChatGPT, limit the teaching relationship between human and machine, and indulge in the false companionship of ChatGPT, it will seriously hinder the effective link between students and the real society, which is not conducive to the cultivation of students' sound personality.

6 ChatGPT Teaching Application Strategy

6.1 Technical level: Optimize tool performance and controllability

6.1.1 *Improve content accuracy - from "generated" to "trusted generated".* First, ChatGPT is connected to authoritative economic databases (such as the World Bank, the National Bureau of Statistics, China Economic Network, etc.) in real time, and the content is automatically marked with data sources, and if there is a contradiction, automatic warning is generated; The second is to embed structured and systematic economic knowledge graph (such as supply and demand theory, monetary policy, inflation, econometric model, etc.) in model training to reduce logical errors.

6.1.2 *Enhanced controllability: from "black box" to "transparent interaction".* Technical research and development can detect the use of ChatGPT technology, improve the transparency of artificial intelligence application services by strengthening the constraint, review and management of artificial intelligence application processes. The first is to develop a special plug-in for economics, showing the reasoning path of ChatGPT, which can trace the theoretical basis and data support behind economic policies; The second is to combine text generation with image, formula and code output to support cross-verification. (For example, interactive diagrams are generated simultaneously when explaining the IS-LM Model.)

6.2 Institutional level: Building a collaborative governance framework

6.2.1 *Improve the mathematical and intellectual literacy of educational subjects.* First, improve teachers and students' ability to use generative AI tools such as ChatGPT. On the one hand, colleges and universities can set up relevant courses and lectures for teachers

and students to popularize artificial intelligence technology, so that teachers and students can learn the working principle of ChatGPT, basic use methods, standardized use skills and other systematic knowledge; On the other hand, universities can also provide practical projects and cases, so that teachers and students can participate in practice, and exercise their ability to apply artificial intelligence technology in real scenarios; In addition, universities should build a platform for teachers and students to exchange artificial intelligence technology, jointly discuss the academic ethics of artificial intelligence, and enhance the alertness of applying artificial intelligence technology. (Liu S,2023) Second, improve the data-driven digital literacy evaluation system. The current digital literacy evaluation content pays more attention to basic technical knowledge and applied skills, and lacks comprehensive evaluation of higher-order abilities such as digital learning and innovation. Therefore, digital literacy evaluation indicators for different subjects should be developed to highlight the comprehensive evaluation of students' higher-order thinking ability of digital literacy and teachers' digital literacy. (Yu Hao, Zhang Wenlan,2025)

6.2.2 *Strengthen academic normative management.* First of all, universities should follow the logic of knowledge production and customize the application guide of ChatGPT according to the characteristics of economics disciplines, so as to grasp the "critical point" of students using artificial intelligence tools to assist knowledge production. In order to prevent students from using data resources too freely and forming technical dependence, the following strategies can be adopted: First, it is clear that violation of corresponding rules (academic norms, academic integrity rules, etc.) constitutes plagiarism, cheating or fraud of ChatGPT application types; Second, students are required to indicate the content generated by ChatGPT and the content completed by the students themselves when submitting assignments; The third is to point out the limitations of ChatGPT to students (such as generating false information), and ask students to actively think and learn to question; Fourth, students are prohibited from using ChatGPT in final assessment scenarios such as exams. [5] Secondly, colleges and universities need to guard against the infiltration of wrong values and ideologies, improve the educational quality and sensitivity of academic values of educational subjects at multiple levels, and set up a multi-dimensional assessment mechanism to ensure the high-quality output of scientific research results and innovative talents in colleges and universities. (Guo Meng,2025)

7 Conclusions and Prospects

7.1 Research conclusions

This paper provides a comprehensive analysis of the key technologies and core functionalities of ChatGPT, along with its application value in the education sector. It further highlights the unique advantages and potential contributions of ChatGPT to the teaching of economics courses. Building on this foundation, the paper delves into the specific applications of ChatGPT in the teaching, learning, and evaluation processes of economics courses. Additionally, it addresses several challenges posed by ChatGPT in educational settings, including concerns over academic integrity such as cheating and academic dishonesty, difficulties in verifying the authenticity

of responses, which may undermine students' self-learning abilities, and challenges to the fundamental principles of education. In response to these issues, the paper proposes countermeasures from both technological and systemic perspectives: technologically, enhancing the accuracy and controllability of content generation; systemically, improving the pedagogical intelligence of educational stakeholders and reinforcing academic normative management.

7.2 Shortcomings and prospects

7.2.1 Insufficient research: First, this paper discusses the application of ChatGPT in teaching, learning and evaluation of economics courses, but does not further demonstrate the application effect and influence of ChatGPT in actual teaching; Second, this paper puts forward coping strategies from the technical and institutional levels respectively, but does not track and evaluate the effectiveness of the proposed strategies to verify their effectiveness and feasibility.

7.2.2 Outlook: First, quantitative evaluation of ChatGPT's application effect and analysis of its specific impact on teaching results; The second is to track and evaluate the effectiveness of the proposed strategy to verify its effectiveness and feasibility.

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