

Another advantage of using ChatGPT is its ability to adapt to students' progress and learning pace. Based on the questions and input provided by the student, ChatGPT can tailor its responses to address this student's specific needs and level of understanding. By adjusting the complexity and depth of the information provided, I can match the student's learning pace and ensure that they receive relevant and helpful guidance. AI product can take into account the feedback and responses provided by the student to gauge their comprehension and adjust its subsequent explanations accordingly. If a student indicates a lack of understanding or asks for further clarification, ChatGPT can modify its responses to ensure better comprehension and address any misconceptions.

Moreover, ChatGPT can serve as a valuable resource for self-paced learning. Students can access the platform whenever they encounter difficulties or need clarification on certain concepts. ChatGPT can provide instant explanations and examples, assisting students in their independent learning endeavors, and provide step-by-step instructions.

Undoubtedly, there exist potential limitations and challenges when utilizing ChatGPT for the purpose of learning technical drawing. A crucial factor is potential inaccuracies in AI-generated responses. Due to the complexity of the subject, AI may occasionally produce responses that are not entirely precise or may contain errors. Therefore, careful review and verification of AI-generated information is necessary to ensure the accuracy and reliability of technical drawing outputs. Hence, there is an ongoing requirement for human supervision, and the importance of balancing AI interaction with hands-on practice.

For instance, employing AI for certain specific tasks in technical drawing can pose challenges due to the presence of uncertainties and potential false answers, even in relatively simple tasks. The complexity and precision required in technical drawing make it essential to exercise caution and validate AI-generated answers for accuracy. Human expertise and thorough review remain crucial in ensuring the reliability and quality of technical drawings.

For example, the following quotes illustrate a request and an answer from ChatGPT for the following task, which aims to explain the instructions for constructing a simple geometric form.

USER: *Provide me with step-by-step instructions for drawing an isometric model of a cylinder with a diameter of 30 mm and a height of 60 mm.*

ChatGPT: *Certainly! Here are step-by-step instructions for drawing an isometric model of a cylinder with a diameter of 30 mm and a height of 60 mm:*

Begin by drawing a horizontal line as the base of the isometric view.

From the left end of the line, draw two lines upwards at a 30-degree angle to create the sides of the cylinder.

Extend the lines upward by a length of 60 mm, representing the height of the cylinder.

Connect the upper ends of the lines with a horizontal line to form the top of the cylinder.

Now, draw two curved lines connecting the corresponding ends of the horizontal lines with the top of the cylinder. These lines should be gently curved to represent the curved surface of the cylinder.

Finally, erase any unnecessary construction lines and add shading or additional details as desired to enhance the visual representation of the cylinder.

Remember to use a ruler or other straight edge tools to ensure accuracy in your measurements and angles. Practice these steps multiple times to improve your skills in drawing isometric models of cylinders.

The instructions provided are not sufficiently accurate, and without additional explanations from the teacher or a thorough examination of proper guidelines, it would be impossible for a student to successfully complete the task. Crucial information regarding concepts such as isometric projection, axis construction, drawing techniques is absent.

For the integrity of the experiment, we have reformulated the request and asked clarifying questions. For example, we inquired about the angles between the axes in isometric projection, the appearance of circle projection in isometric projection, and whether the dimensions of objects change in isometric projection compared to their natural size. ChatGPT accurately and reliably provided theoretical information based on individual inquiries. However, a clear step-by-step construction algorithm has not been provided yet. On the other hand, performing a keyword search on YouTube can yield videos demonstrating detailed examples and instructions.

We have asked students with no background in technical drawing to draw a cylinder based on ChatGPT's explanations, and the students were unsuccessful. Even those with a technical drawing background who clearly knew how to complete the task struggled to follow each step precisely.

When engaging with AI, it is crucial to formulate accurate and detailed requests to enhance the chances of receiving the desired information or response. However, even having made precise requests, there is no guarantee that you will receive an accurate answer due to potential limitations or errors in AI models. Therefore, the presence of a teacher or instructor is essential in the context of working with AI. They play a vital role in evaluating and verifying the accuracy of students' work, providing valuable feedback to guide their learning process.

Teachers possess the expertise and experience to assess the quality and validity of students' outputs, helping them identify any misunderstandings or errors that may have arisen during their interaction with AI systems. Feedback from a teacher acts as a critical component for students to correct and improve their work. It bridges the gap between the limitations of AI and the necessary guidance required for students to develop a deeper understanding of the subject matter.

Ultimately, the combination of AI technology and human guidance through teachers ensures a more comprehensive and accurate learning experience, enabling students to navigate the complexities of working with AI effectively. However, AI endeavors to offer helpful and pertinent information, aiming to

bolster students' learning journeys and render them more engaging and captivating.

It is important to note that as AI technologies continue to develop, educators are faced with the challenge of adapting their teaching strategies to effectively incorporate these tools into the learning process. It is imperative for students to foster critical thinking skills and digital literacy abilities, as well as for teachers to remain up-to-date with the latest developments in AI and continuously enhance the learning experience.

Teachers look at the issue from different perspectives. They believe it's crucial to guide students on using ChatGPT AI and teach them how to crosscheck the AI responses, and how to critically evaluate and verify information. However, teachers understand, that they should possess advanced knowledge and skills themselves about the limitations and biases of the AI technologies – and provide accurate guidance and ensure that students are not solely relying on AI for information.

At the same time, it seems unrealistic to expect teachers to have extensive knowledge and skills in AI and to guide students on using ChatGPT AI – sometimes it's important for subject teachers to collaborate with experts in AI and incorporate their guidance and resources into the university curricula.

Overall, it's evident from educators' opinions that there is a range of perspectives to improve the practice. Some believe it is essential for teachers to generate advanced knowledge and skills in AI to effectively guide students, while others see the need for collaboration with AI experts to navigate this complex landscape. Overall, there is recognition that guiding students on using ChatGPT AI and crosschecking its responses requires careful consideration and ongoing professional development for teachers to ensure students receive accurate and responsible guidance.

Conclusions. Leveraging AI technologies like ChatGPT for learning technical drawing brings significant benefits to the learning process. It enhances student engagement, provides personalized feedback, offers interactive learning experiences, and promotes self-paced learning. By incorporating AI into education, teachers can create a more engaging and effective learning environment, enabling students to develop their technical drawing skills more efficiently and confidently.

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