Проблеми викладання математики у закладах освіти: теорія, методика, практика: тези доповідей ІІІ Міжнародної конференції на честь 105-річчя О.В. Погорелова (26–28 березня, м. Харків, Україна). – Харків : ХНУ імені В. Н. Каразіна, 2024. – с. 164-167

CHAT TECHNOLOGIES IN TEACHING MATHEMATICS DISCIPLINES IN HIGHER EDUCATION: A CORRECT USING STRATEGY

Yuliia Sytnykova
Kharkiv National University Radio Electronics, Kharkiv, Ukraine

The current trends in the dialogue technologies utilizing in higher education is considered, new realities in the use of chat technologies to improve the educational process are highlighted. The advantages and disadvantages of implementing chat technologies based on ChatGPT in a studying mathematical disciplines are emphasized. Conclusions are drawn about the further correct implementation of chat technologies in higher education.

Keywords: dialogue technologies, ChatGPT, mathematics disciplines, correct strategy.

Dialogue is a key and integral tool for learning, as it promotes mutual understanding, ideas exchange and constructive problem solving. Dialogue learning is aimed at active interactions between the teacher and the student, establishing a cooperation in knowledge construction, and creating a dynamic environment to produce new ideas. Such interactivity dialogue expands the active interaction range between all participants in the learning process, contributing to in-depth understanding, knowledge awareness and the critical thinking development.

Undoubtedly, the innovative technologies utilizing based on the artificial intelligence, such as chatbots or virtual assistants, they have a powerful potential to enhance it by creating an accessible interactive dialogue learning environment. However, there are hidden disadvantages and threats, along with the significant advantages and use convenience of such chatbots, like the ChatGPT. “The implementation of ChatGPT in the context of an educational institution brings with it a wide range of opportunities as well as challenges for teachers [1]”. This is what users should know and remember. Therefore, teachers should conduct active educational and outreach activities with students aimed at the modern technologies correct using in compliance with all academic integrity requirements. The teachers should be clearly aware of “how important it is to develop a responsible approach when making use of technology in educational settings [2].”

Among the using ChatGPT advantages are the following: the possibility to conduct an interactive dialogue about theoretical issues, receiving information support in clarifying mathematical concepts (definitions, theorems, axioms), discussing the choosing method process and creation an algorithm to solve comprehensive mathematics problems. But all of this, of course, cannot completely replace the teacher or reduce the learning material value provided by textbooks. It can be a certain source of auxiliary reference information, in particular, to expand certain knowledge, to check students’ own solutions (for self-checking). Indeed, it should

perform the support function and work as a portable assistant in the temporary teacher absence (lack of communication with the teacher at a certain point in time).

At the same time, there are also some disadvantages, such as: the limited depth of the certain nuances understanding of a mathematics problem solution, providing false solutions and answers, dependence on the questions wording (requests for certain information, tasks), limited resource base of the chat, certain graphical limitations of the ChatGPT software. Unfortunately, the chatbot is able to solve mathematics problems only at the standard (algorithmic) level, i.e., the chatbot makes substantive and arithmetic errors, it has some difficulty with mathematics expressions transformations in the comprehensive (creative, non-standard) math tasks solution [3]. The formulation of the theorems is rather simplified.

In addition, there are other psychological threats, such as reduced learning motivation and independent thinking loss. There is also a risk that excessive dependence and trust in chatbots will lead to low final knowledge rates and significantly affect the formation of independent opinions, to be able to communicate, to be a socially mature personality. “For teachers, over-dependence on ChatGPT can reduce the quality of their interactions with students and exacerbate existing inequalities [2].”

Of course, we cannot remove, ban or stop such chatbots utilizing in today’s technologically advanced information space. We don’t need to. All we have to do is learn ourselves and help students to use the achievements of technological progress properly and to involve it in the learning process. We just need to take control of this process and constantly monitor it.

What should we do? Firstly, we should introduce young people to such developments by focusing on explaining the main purpose of chatbot technologies, instilling correct use of AI technologies skills, and forming an integrity culture starting from the secondary school. We should also highlight the negative impact, talk about the dependence on uncontrolled AI technologies use. Secondly, we should intensify the teacher’s professional training (and retraining), deepen their digital information competence, and master psychological and pedagogical tools. Thirdly, strengthening control over students’ knowledge (availability of various cross-checking methods), expanding the creative component of assignments, conducting a lively dialogue, discussing situational tasks (professionally oriented practice task). Fourthly, control the motivational component of the education process, both for students and teachers.

Thus, in order to make chatbot technologies useful rather than destructive for the education process, their implementation should be controlled and adjusted (subordinated, coordinated) in accordance with the basic didactics’ principles

REFERENCES

1. D. Mhlanga. “**Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning**”, SSRN Electronic Journal, 2023, available at https://doi.org/10.2139/SSRN.4354422

2. M. Farrokhnia, S. K. Banihashem, O. Noroozi & A. Wals. "**A SWOT analysis of ChatGPT: Implications for educational practice and research**", Innovations in Education and Teaching International, 2023, available at https://doi.org/10.1080/14703297.2023.2195846

3. T. Lukashova, M. Drushlyak. "**Artificial intelligence as a means of developing pre-service mathematics teachers' critical thinking**", Physical and Mathematical Education, Vol. 38, No.5, pp. 18-25, 2023, available at https://doi.org/10.31110/2413-1571-2023-038-5-003.