Bobro Natalia
Ph.D., Doctor of Philosophy,
Director of the Digital Department European University,
Director of the "NooLab & AI"Scientific Laboratory
of the European University,
Private Higher Education Establishment "European University"
Kyiv, Ukraine
ORCID: https://orcid.org/0009-0003-5316-0809

GLOBAL ECONOMIC IMPACT OF CHATBOT INTEGRATION IN HIGHER EDUCATION INSTITUTIONS

The modern world is experiencing rapid changes in education and technology, presenting new challenges and opportunities for educational institutions. The integration of artificial intelligence (AI)-powered chatbots in higher education institutions introduces new prospects for optimizing educational processes [1, p. 56]. The use of chatbots allows automating routine tasks, reducing the workload of educators, and providing students with real-time access to individualized learning materials. The economic impact of these innovative solutions includes reducing the administrative cost and improving the efficiency of the educational process, which can, in turn, improve the overall quality of education and increase the competitiveness of institutions within the global educational network.

It is important to note that the heavy workload placed on teachers, due to the need to manage numerous administrative tasks, is also a common challenge in modern education. Such a workload can lead to a decrease in the efficiency of the educational process, as it restricts the teachers can dedicate to teaching students.

One promising area for optimizing the educational process is the integration of information and communication technologies. The use of online platforms, video conferencing systems and electronic document management could automate routine operations, enhance the efficiency of communication among participants in the educational process, and ensure the flexibility in learning. The issue of synchronous communication in teaching disciplines in the context of blended learning is also becoming increasingly relevant [2; 3].

The rapid development of mobile technologies has contributed to the proliferation of chatbots as a convenient tool for human-machine interaction. The artificial intelligence powering modern chatbots enables automating many processes, from information exchange to personalized recommendations. These AI-based technologies are widely used in institutions and businesses to automate many processes. In the scientific literature, artificial intelligence is defined as the capability of automatic computing systems to perform certain intelligence functions [4; 5].

Chatbots, as interactive software agents, are widely employed across various fields of human activity. Their capabilities range from simple information exchange with users to more complex tasks, such as providing personalized recommendations or supporting educational processes. With their intuitive interface and ability to think logically, chatbots are becoming indispensable tools for both business and education.

A chatbot is an artificial intelligence-powered program that simulates human conversation and can instantly respond to users' questions through various channels, including messaging platforms, websites, phones, or mobile apps [4, p. 64].

Computer programs, particularly those utilizing artificial intelligence to analyze and interact with the users, have the potential to transform the educational process. Due to their capabilities, these programs not only optimize access to learning resources, but also have the ability to individualize learning, enhance student motivation, and provide the necessary support in various situations. The importance of such innovations depends on the functionality of chatbots, developers' awareness of students' needs, and effective collaboration with IT departments.

If a bot is powered by artificial intelligence, it is trained to analyze speech and text using "language models" and information stored in specially structured databases classified into different categories. This enables bots to understand the context and interact with users on a deeper level. A key feature is the ability of bots to recognize and understand the users, even when faced with typos, slang or jargon, thanks to the use of various methods and scenarios that extend beyond simple keyword recognition.

With proper funding and organization, students can use chatbots on a continuous basis, which is especially important for those who face busy study and work schedules. When supported by a robust database, chatbots can offer personalized recommendations. Unlike humans, who may be constrained by their own schedule and time to respond, chatbots provide instant responses.

Depending on the settings, chatbots can also analyze student queries, allowing for database adjustments and service quality improvements.

The introduction of digital technologies significantly reduces teachers' workloads, enabling them to concentrate on the core aspects of their professional activities, such as education and research. In the digital era, educational institutions must adapt to the latest technological trends to meet contemporary demands and effectively integrate advanced solutions into their operations. This adaptation not only optimizes work processes but also enhances the institution's reputation, aiding in the attraction of new students.

Another important aspect is the economic benefit of implementing chatbots, which is manifested not only in cost reduction but also improved management efficiency in educational institutions. Chatbots can decrease the need for additional administrative staff and reduce the cost associated with manual information processing, which is especially important for large higher education institutions with a large number of students. In the long run, these efficiencies can lower the overall cost of educational services and enhance their accessibility to a wider range of people, thereby making education more inclusive and democratic.

Given all of the above, we can conclude that the high workload of teachers, due to the need to address numerous organizational issues, is a prevalent problem in modern education. This workload often leads to a decrease in the quality of the educational process and delays in providing feedback to students. Chatbots can be an effective tool to address these issues by automating student request processing, providing prompt support and information, and streamlining assessment and feedback. This not only alleviates the administrative burden on instructors, but also contributes to a faster and more efficient learning process, boosting overall productivity and student satisfaction. In addition, the integration of chatbots can improve the global competitiveness of higher education institutions, providing them with the ability to reduce costs and improve the quality of educational services in the context of global economic and technological trends.

References:

1. Kolodinska Ya. O., Skliarenko O. V., Nikolaievskyi O. Iu. (2022) Praktychni aspekty rozrobky innovatsiinykh biznes idei z vykorystanniam tsyfrovykh servisiv. *Ekonomika i upravlinnia*, no. 4, pp. 53–60. DOI: https://doi.org/10.36919/2312-7812.4.2022.53

2. Skliarenko O. V., Yahodzinskyi S. M., Nikolaievskyi O. Iu., Nevzorov A. V. (2024) Tsyfrovi interaktyvni tekhnolohii navchannia yak nevidiemna skladova

suchasnoho osvitnoho protsesu. *Innovatsiina pedahohika*, no. 68 (2), pp. 51–55. DOI: https://doi.org/10.32782/2663-6085/2024/68.2.51

3. Khomenko O. O., Paustovska M. V., Onyshchuk I. A. (2024) Vplyv interaktyvnykh tekhnolohii na protses navchannia i rozvytok zdobuvachiv vyshchoi osvity. *Naukovi innovatsii ta peredovi tekhnolohii*, no. 5(33), pp. 1222–1231. DOI: https://doi.org/10.52058/2786-5274-2024-5(33)-1222-1231

4. Bobro N. S. (2024) Tsyfrova platforma yak suchasna orhanizatsiina innovatsiia. *Investytsii: praktyka ta dosvid*, no. 1, pp. 63–66. DOI: https://doi.org/10.32702/2306-6814.2024.1.63

5. Huk P. V., Skliarenko O. V. (2022) Ekonomichna dotsilnist modernizatsii pidpryiemstv z vykorystanniam avtomatyzovanykh system. *Ekonomika i upravlinnia*, no. 2, pp. 103–112. DOI: https://doi.org/10.36919/2312-7812.2.2022.103