

Synergy of Minds and Machines: An Action Research Study on ChatGPT's Role in Transforming the Learning Process.

A. Kotłowska*, Social Sciences Department, SWPS University of Social Sciences and Humanities, Warsaw Campus, Chodakowska 19/31, 03-815, Warsaw, Poland.

Keywords: Artificial Intelligence, cognitive development, ChatGPT, human-machine collaboration.

1. INTRODUCTION

This article aims to explore the effectiveness of AI in supporting or hindering student learning. Drawing on theories on multimedia learning [1] and the concerns regarding the shallow effects of the technology on cognition [2], this study examines the potential of AI to enhance learning experiences. The collaboration between human minds and machines in the learning process is critical. Technology-driven tools can personalize learning experiences, adapt to individual learning speeds, and provide immediate feedback. Furthermore, educational data mining and learning analytics can uncover insights about student interactions, learning behaviors, which can inform the design of more effective teaching strategies [3].

Despite a number of possible educational advantages from using AI, many researchers have argued that ChatGPT also presents significant downsides [4]. There's a risk of students becoming overly reliant on technology, potentially at the cost of developing their independent problem-solving skills. Given the current limitations of ChatGPT, students might experience the risk of using misleading information produced by this innovative application [5]. ChatGPT has been argued to have a harmful impact on students' development of essential skills, including critical thinking skills, problem-solving skills, and imagination as well as research abilities [6].

2. METHODOLOGY

The advent of new technology compels us to rethink pedagogical approaches, thus employing an action research methodology [7] seems appropriate. The theoretical framework is grounded in the revised Bloom's taxonomy [8] providing a structured approach to cognitive skills development. The planned intervention involved integrating ChatGPT into the preparation phase of an Oxford-style debate. The intervention was implemented with 104 undergraduate students enrolled in the BA in Management and Leadership program at SWPS University, Warsaw Campus. Two Polish-speaking cohorts and two English-speaking cohorts participated in the intervention, which took place in April-May of 2023.

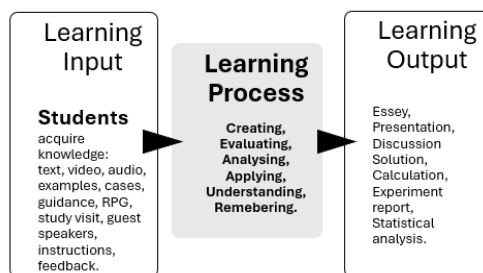
Data was collected from qualitative observations and quantitative surveys. The tutor conducted systematic observations of specific aspects, selected for their capacity to be recorded and evaluated, such as: physical space, Chair/Table Layout, collaboration among students, social interactions, tutor support, preparation speed, presentation skills, argument quality. Students had the opportunity to express their views answering following survey questions:

1. To what extent can ChatGPT improve discussion and interaction in classrooms?
2. To what extent can ChatGPT provide valuable insights and perspectives during class activities?
3. What is the satisfaction level among respondents using ChatGPT in the classroom?
4. Should ChatGPT be used regularly in the classroom?

3. RESULTS AND CONSLUTIONS

Survey findings reveal that while 62% of students acknowledged ChatGPT's ability to provide useful insights, only 38% felt it positively impacted classroom discussions. Only a minority (27%) supported its regular use. The classroom observations allowed to compare Human-assisted and AI-assisted learning process, identifying potential risks to cognitive development (see figure 1).

Human-assisted Learning Process



AI-assisted Learning Process

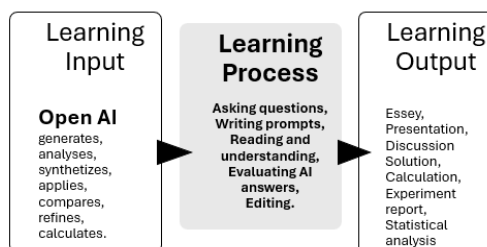


Figure 1. Comparison of Human-assisted and AI-assisted Learning Process.

The research findings allowed to create a new theoretical model, HAALO (Human-assisted and AI-assisted Learning Output), in which AI augments rather than replaces human intellectual engagement (see figure 2).

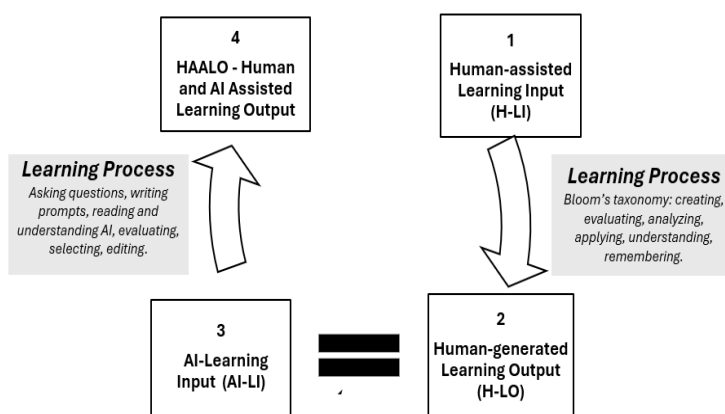


Figure 2. Synergy of Minds and Machines in HAALO model (Human and AI-assisted Learning Output).

REFERENCES

1. Mayer, R.E.: Cognitive Theory of Multimedia Learning. In: Mayer, R.E. (ed.) The Cambridge Handbook of Multimedia Learning, pp. 43–71. Cambridge University Press (2014).
2. Carr, N.: The Shallows: What the Internet Is Doing to Our Brains. W.W. Norton & Company (2010).
3. Baker, R.S., Siemens, G.: Educational Data Mining and Learning Analytics. In: Sawyer, R.K. (ed.) Cambridge Handbook of the Learning Sciences, 2nd edn., pp. 253–274. Cambridge University Press, Cambridge (2014).
4. Cotton, D.R.E., Cotton, P.A., Shipway, J.R.: Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. Innovations in Education and Teaching International (2023). <https://doi.org/10.1080/14703297.2023.2190148>
5. Van Dis, E.A., Bollen, J., Zuidema, W., van Rooij, R., Bockting, C.L.: ChatGPT: Five priorities for research. Nature 614, 224–226 (2023).
6. Baidoo-Anu, D., Owusu Ansah, L.: Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. SSRN (2023).
7. McNiff, J.: Action Research: Principles and Practice. Routledge (2013).
8. Anderson, L.W., Krathwohl, D.R.: A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives. Longman (2001).