

# Perspectives on Implications of ChatGPT on Teaching, Learning, Research and Innovation in the Higher Education Sector

**Fulufhelo Netswera**

<https://orcid.org/0000-0001-5382-4992>  
Durban University of Technology  
FulufheloN@dut.ac.za

**Lindiwe Zungu**

<https://orcid.org/0000-0001-5820-0281>  
University of South Africa  
zunguli@unisa.ac.za

## Introduction and Background

As of 16 March 2023, 26,222 prominent entrepreneurs and business executives had signed a petition to cease all Artificial Intelligence (AI) experimentation and training beyond GPT-4.<sup>1</sup> The rationale for this intervention was to examine the impact of AI developments and whether they pose a major risk to humanity. The petitioners believe that current AI developments can compete with humans in almost all respects and caution that AI technological advancements can lead to developments beyond human control with a high potential to outsmart humans.

Teaching and learning (T&L), research and innovation form the backbone of the higher education sector. Higher education institutions develop individuals' intellectual, operational and technical abilities for a functional society. By its definition, a higher education institution and a university in particular is a provider of facilities and resources that enable intellectuals and expertise to facilitate T&L, research and community engagement.<sup>2</sup> Recently, the question of community engagement viewed in respect of its earlier reference to the triple helix has been redefined into quad helix as “engagement” to embrace all “stakeholders”. Here, mutual T&L between the higher

- 
- 1 Future of Life. (22 March 2023) Pause giant AI experiments: An open letter. Future of Life. Retrieved from <https://www.futureoflife.org/open-letter/pause-giant-ai-experiments/>
  - 2 Kimatu, J. N. (2016) Evolution of strategic interactions from the triple to quad helix innovation models for sustainable development in the era of globalization. *J Innov Entrep* 5, 16 <https://doi.org/10.1186/s13731-016-0044-x>



New Voices in Psychology  
<https://unisapressjournals.co.za/index.php/NV>  
Volume 13 | 2023 | #15464 | 7 pages

<https://doi.org/10.25159/2958-3918/15464>  
ISSN 2958-3918 (Online), ISSN 1812-6371 (Print)  
© The Author(s) 2024



Published by Unisa Press. This is an Open Access article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International License (<https://creativecommons.org/licenses/by-sa/4.0/>)

education sector and industries continues to increase learning machine technologies for operational purposes in agriculture, manufacturing, and packaging.<sup>3</sup>

## Teaching and Learning Technological Evolution

For as long as the art of writing and T&L has been common among mankind, modernisation efforts in this sphere have unceasingly been overwhelmed by discoveries. From as far back as the use of the papyrus through Egyptian Times, the use of the ink pen, which is yet another Egypt novelty around 300 Before Christ (BC), the Chinese Hun's discovery of modern paper between 25 and 220 Anno Domini (AD) to the fountain and ballpoints, respectively in 1827 and 1930s.<sup>45</sup>

Technological or rather automatised of T&L can discreetly be traced back to the printer in wooden inked blocks (xylography) by the Japanese around 764 and typographic printing around the 1450s, evolving to modern-day colour printing.<sup>67</sup> The typewriter came around 1868 through Christopher Latham Sholes; computing in the 1960s and the personal computers (PC) in 1968 by Hewlett-Packard.<sup>89</sup> The ability to transmit and store documentation electronically through emails in 1971 by Tomlinson and cloud computing was championed by IBM between the 1970s and 1990s - yet another quantum leap in the evolution of T&L systems.<sup>101112</sup>

- 
- 3 Malele, V., K. Mpofo and M. Muchie. (2019) Bridging the innovation chasm: Measuring awareness of entrepreneurship and innovation policies and platforms at the universities of technology in South Africa. *African Journal of Science, Technology, Innovation and Development* 11 (7), 783–793. 019 <https://doi.org/10.1080/20421338.2019.1586110>
  - 4 Local Histories. (26 January 2022) The story of the pen. Local Histories. Retrieved from <https://www.localhistories.org/history-of-the-pen/>
  - 5 vd Merwe, W. (12 January 2023) History of pens. Pens South Africa. Local Histories. Retrieved from <https://www.pens.co.za/history-of-pens>
  - 6 Britannica. (n.d) History of printing, origins in China. Britanica. Retrieved from <https://www.britanica.com/topic/printing-publishing/the-Gutenberg-press>
  - 7 Computer Hope. (Updated 04 February 2019) Computer printing history. Retrieved from <https://www.computerhope.com/history/printer.htm>
  - 8 The editor Encyclopaedia. (Latest update 20 March 2023) Personal computer technology. Retrieved from <https://www.Britanica.com/technology/personal-computer>
  - 9 Cabral, L. (15 January 2021) The history of typewriters. Back then History Retrieved from <https://www.backthenhistory.com/articles/the-history-of-typewriters>
  - 10 Steinbrink, K. (11 April 2023) The history of email: Major milestones from 50 years. Email on Acid. Retrieved from <https://www.emailonacid.com/blog/article/email-marketing/history-of-email/>
  - 11 Farris, C. (5 December 2019) History of Cloud Storage. Capacity. Retrieved from <https://www.capacity.com/cloud-storage/history-of-cloud-storage/>
  - 12 Computer History Museum (CHM). (10 April 2023) Timeline of Computer History. Retrieved from <https://www.computerhistory.org/timeline/memory-storage>

## Computing in Teaching and Learning

Since 1989, when Time Berners-Lee founded the World Wide Web (WWW) at the European Research Laboratories (CERN) in Geneva, access, sharing and use of T&L information among authors, researchers, and policy-making organisations around the world eased and equally proliferated citations across the globe.<sup>13</sup> Each of the newer developments generates new sets of T&L complications however, such as plagiarism and misrepresentation of whole bodies of works in other contexts as one's own. Equally, newer counter-plagiarism computing applications like Turn-it-in, RefWorks and EndNote are continuously innovating.<sup>14</sup>

Novel T&L learning and online platforms like Blackboard and Moodle have now come of age. From 2020 to 2022, when the COVID-19 pandemic placed countries and institutions under total lockdown, this inadvertently fast-tracked online T&L worldwide.<sup>15</sup> Even newer T&L facilitation platforms like Zoom and MS Teams have overwhelmingly simplified access worldwide for as long as one has "data". The question of space and place in learning is slowly fading as "classes" can be composed of "learners" and "facilitators" from anywhere in the world. Without higher education regulations within and among nations, competition would drain poorer and less-resourced institutions into oblivion.

Another recent T&L perversion is that graduates from low-income countries are content generators for middle- and upper-income students. For example, students from the United Kingdom and the United States of America (USA) are commissioning assignments and thesis ghost authors from Nairobi. Some of the commissioned work yields novel, scientific outcomes based on pricing.<sup>16</sup> The authenticity of knowledge development and acquisition becomes more elusive.

## What is ChatGPT?

ChatGPT is one of the latest AI revolutions. It is a chatbot instrument developed by an American artificial intelligence company (OpenAI) and launched on 30th November 2022. This innovation is punted to be a radical machine learning tool that simulates human intelligence, provides instant answers, and is likely to disrupt the higher

- 
- 13 Meyer, E. and R. Schroeder. (2009) The world wide web of research and access to knowledge. *Knowledge Management Research & Practice* 7. Doi - 10.1057/kmrp.2009.13
  - 14 Batane, T. (2010) Turning to turnitin to fight plagiarism among university students. *Journal of Educational. Technology & Society* 13 (2), 1–12
  - 15 Netswera, F., A. A. Woldegiyorgis and T. Karabchuk. (ed). (2022) Higher education and the COVID-19 pandemic cross-national perspectives on the challenges and management of higher education in crisis times. Brill
  - 16 Njambi-Szlapka, S. (n.d) What Kenyan ghost-writers can teach us about prejudice in the digital gig economy. ODI Retrieved from [Http://www.odi.org/en/insights/what-Kenya-ghost-writers-can-teach-us-and-prejudice-in-the-digital-gig-economy](http://www.odi.org/en/insights/what-Kenya-ghost-writers-can-teach-us-and-prejudice-in-the-digital-gig-economy)

education sector and all of its facets, i.e., T&L, research and most of the daily operational routines. ChatGPT will revolutionise higher education and all forms of life, as was the case with the cellular phone. A few warning bells have already been sounded, suggesting that ChatGPT could threaten T&L. However, counter-ChatGPT detection innovations are underway, enabling school teachers to identify the ChatGPT-assisted assignment.<sup>1718</sup>

Paying close attention to the pros and cons, if ChatGPT were to increase, Lucas Stock in 2023 wrote about possible implications to the higher education sector thus, “experts say artificial intelligence chatbots like ChatGPT are changing the way students are taught and study.<sup>19</sup> These “language models” AIs can write flawless-looking academic essays. Is it a threat or opportunity, or both?”<sup>20</sup> This means, unlike Google and other search engines before it, ChatGPT cannot only provide search results but also construct and organise texts better than an average student.

On why ChatGPT is a game changer, Adriana Hoyos believes that “ChatGPT has achieved state-of-the-art performance in various natural language processing tasks, such as question answering, text generation, and document classification. The model has a large capacity, with more than 175 billion parameters, and has been fine-tuned on a broad spectrum of internet text sources and data, making it capable of handling a wide range of topics and generating coherent, informative, and congruent responses.”<sup>21</sup>

Although there is still insufficient evidence to suggest the forms and types of possible higher education and specifically T&L disruptions from ChatGPT, it is argued that ChatGPT can be used to write glowing research papers on behalf of students. Borrowing directly with paraphrases, here are the good and bad of ChatGPT that Adriana Hoyos thinks we should contemplate and mitigate:<sup>22</sup>

- 
- 17 Stock, L. (24 January 2023) ChatGPT is changing education, AI experts say — but how? DW. Retrieved from <https://www.dw.com/en/chatgpt-is-changing-education-ai-experts-say-but-how/a-64454752>
  - 18 Jimenez, K.. (13 April 2023) Professors are using ChatGPT detector tools to accuse students of cheating. But what if the software is wrong? Yahoo! News. Retrieved from <https://news.yahoo.com/professors-using-chatgpt-detector-tools-093105927.html>
  - 19 Stock, L. *ibid.*
  - 20 Stock, L. *ibid.*
  - 21 Hoyos, A. (9 February 2023) Unpacking ChatGPT: The pros and cons of AI’s hottest language model. IE University. Retrieved from <https://www.ie.edu/insights/articles/unpacking-chatgpt-the-pros-and-cons-of-ais-hottest-language-model/>
  - 22 Gale, A. (20 February 2023) ChatGPT threatens university education academics warn. Greek Reporter. Retrieved from ChatGPT Threatens University Education, Academics Warn ([greekreporter.com](http://greekreporter.com))

- If we incorporate ChatGPT in-class activities and prohibit its use, this might resolve problems associated with cheating.
- New T&L and assessment models would have to be founded to test knowledge and application and infuse human imagination, the realm of scenarios and speculations where ChatGPT might not be highly competent.
- Automation of menial tasks is possible through ChatGPT. In the world of T&L, such tasks as assessment of tests and assignments could easily be taken over by ChatGPT, whose ability and consistency with grading tests and assignments is likely to be standardised and eliminate sentimental human values.
- There are already counter-cheating applications outside of ChatGPT, and embedded innovations are equally surging;<sup>23</sup>
- Students can use ChatGPT as a chatbot to ask for clarification or information about course materials, saving time for instructors who might otherwise be answering the same questions and
- Virtual tutoring can be made easily accessible and possible by ChatGPT – virtual one-on-one or group tutoring for students who need extra help.

Recent developments also suggest that ChatGPT can provide misleading information or generate fake citations to research articles that do not exist.<sup>24</sup> When asked to provide empirical evidence to support a claim, ChatGPT can be a tool for spreading false information. This includes making up papers and citations and providing fake Digital Object Identifiers (DOIs) and fake links to PubMed, which can interrupt the research process and outcomes and have significant implications on academic work.

Several higher institutions globally are ramping up other methods to detect assignments or articles ChatGPT wrote to prevent cheating or discourage others from cheating. Arguably, one thing is certain: ChatGPT has already impacted the world as we know it, not only in the higher education, research, and innovation spheres but also in the corporate world. The scary implications about the development of GPT-4 and beyond is that it might “come alive” and attain independent thinking outside human control. As with the application of research ethics in the higher education sector, independent laboratories should equally be vetted to identify and halt innovations that can potentially harm humanity.

---

23 Cotton, D. R. E., P. A. Cotton & J. R. Shipway (2023) Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*. DOI: 10.1080/14703297.2023.2190148

## References

- Batane, T. (2010) Turning to turnitin to fight plagiarism among university students. *Journal of Educational Technology & Society* 13 (2), 1–12
- Britannica. (n.d) History of printing, origins in China. Britannica. Retrieved from <https://www.britanica.com/topic/printing-publishing/the-Gutenberg-press>
- Cabral, L. (15 January 2021) The history of typewriters. Back then History Retrieved from <https://www.backthenhistory.com/articles/the-history-of-typewriters>
- Computer History Museum (CHM). (10 April 2023) Timeline of Computer History. Retrieved from <https://www.computerhistory.org/timeline/memory-storage>
- Computer Hope. (Updated 4 February 2019) Computer printing history. Retrieved from <https://www.computerhope.com/history/printer.htm>
- Cotton, D. R. E., P. A. Cotton and J. R. Shipway (2023) Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*. <https://doi.org/10.1080/14703297.2023.2190148>
- The editor Encyclopaedia. (Latest update 20 March 2023) Personal computer technology. Retrieved from <https://www.Britanica.com/technology/personal-computer>
- Farris, C. (5 December 2019) History of Cloud Storage. Capacity. Retrieved from <https://www.capacity.com/cloud-storage/history-of-cloud-storage/>
- Future of Life. (22 March 2023) Pause giant AI experiments: An open letter. Future of Life. Retrieved from <https://www.futureoflife.org/open-letter/pause-giant-ai-experiments/>
- Gale, A. (20 February 2023) ChatGPT threatens university education academics warn. Greek Reporter. Retrieved from ChatGPT Threatens University Education, Academics Warn([greekreporter.com](http://greekreporter.com))
- Hoyos, A. (9 February 2023) Unpacking ChatGPT: The pros and cons of AI's hottest language model. IE University. Retrieved from <https://www.ie.edu/insights/articles/unpacking-chatgpt-the-pros-and-cons-of-ais-hottest-language-model/>
- Jimenez, K. (13 April 2023) Professors are using ChatGPT detector tools to accuse students of cheating. But what if the software is wrong? Yahoo! News. Retrieved from <https://news.yahoo.com/professors-using-chatgpt-detector-tools-093105927.html>
- Kimatu, J. N. (2016) Evolution of strategic interactions from the triple to quad helix innovation models for sustainable development in the era of globalization. *J Innov Entrep* 5, 16 <https://doi.org/10.1186/s13731-016-0044-x>
- Local Histories. (26 January 2022) The story of the pen. Local Histories. Retrieved from <https://www.localhistories.org/history-of-the-pen/>

- Malele, V., K. Mpofu and M. Muchie. (2019) Bridging the innovation chasm: Measuring awareness of entrepreneurship and innovation policies and platforms at the universities of technology in South Africa. *African Journal of Science, Technology, Innovation and Development* 11 (7), 783–793. <https://doi.org/10.1080/20421338.2019.1586110>
- Meyer, E. and R. Schroeder. (2009) The world wide web of research and access to knowledge. *Knowledge Management Research & Practice* 7. <https://doi.org/10.1057/kmrp.2009.13>
- Netswera, F., A. A. Woldegiyorgis and T. Karabchuk (ed). (2022) Higher education and the COVID-19 pandemic cross-national perspectives on the challenges and management of higher education in crisis times. Brill. <https://doi.org/10.1163/9789004520554>
- Njambi-Szlapka, S. (n.d) What Kenyan ghost-writers can teach us about prejudice in the digital gig economy. ODI Retrieved from: <http://www.Odi.org/en/insights/what-Kenya-ghost-writers-can-teach-us-and-prejudice-in-the-digital-gig-economy>.
- Steinbrink, K. (11 April 2023) The history of email: Major milestones from 50 years. Email on Acid. Retrieved from <https://www.emailonacid.com/blog/article/email-marketing/history-of-email/>
- Stock, L. (24 January 2023) ChatGPT is changing education, AI experts say — but how? DW. Retrieved from <https://www.dw.com/en/chatgpt-is-changing-education-ai-experts-say-but-how/a-64454752>
- vd Merwe, W. (12 January 2023) History of pens. Pens South Africa. Local Histories. Retrieved from <https://www.pens.co.za/history-of-pens>