# 1

# Nurturing an Inquisitive Mind in the Era of All-Knowing Chatbots

The rise of artificial intelligence (AI) and chatbots capable of producing human-like text represents a technological revolution. As with any other revolution, people are not entirely certain of what they are experiencing. There is a mixture of excitement and concern. If these technologies are so intelligent and seem to be constantly improving, will they eventually replace humans in the workplace? Educators share similar worries. Students no longer need to slog through thick books – chatbots can summarize them in seconds. Writing, an essential skill in education, risks being neglected because chatbots make it easy to bypass the effort. This chapter argues that education, particularly in critical thinking, is now more important than ever for students. Regardless of how much data feeds chatbots, they cannot directly comprehend the ever-changing world of their users. Furthermore, chatbots can only process explicit, propositional knowledge – they lack the unspoken, intuitive knowledge that humans rely upon. This is why students with strong critical thinking skills continue to have the upper hand in using this technology effectively.



## 1.1. Introduction

Learning is endangered. The temptation to avoid learning has become almost irresistible, as modern information and communication technology (ICT) immerses students – many of whom have grown up as digital natives – in their devices, bombarding them with entertainment, emotionally charged content and endless interactions (Wilmer and Chein 2016; Hanin 2021). While students may struggle to resist digital distractions, they must still engage with learning to meet academic requirements. However, an even more concerning challenge now emerges from generative AI technology, which is beginning to erode the learning process by performing tasks that once required intellectual effort (Lata and Kumar 2022; Shum

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2024). Essay writing, once one of the most challenging academic tasks for students, can now be completed by simply providing a chatbot such as ChatGPT with a basic prompt (Livingstone 2024; Lata and Sharma 2024a). As AI increasingly handles cognitively demanding tasks, a provocative and controversial question arises: Why endure the challenges of learning when technology provides readily available solutions, especially in an environment already saturated with digital distractions? This shift necessitates a critical re-evaluation of how educational systems can preserve the value of active learning in the AI age (Lata et al. 2024).

Humans have long sought ways to offload cognitive tasks when the mental load becomes too overwhelming (Risko and Gilbert 2016). Over time, they have developed tools to increase their cognitive capacity. Early technologies, such as pen and paper, were used to store memories, record knowledge and pass it on to future generations (Kumar and Lata 2022). Without such tools, managing complex calculations and preserving knowledge would have been nearly impossible. Devices such as the abacus enabled societies to carry out intricate calculations in daily commerce. Prior to the advent of digital technology, these tools primarily served as aids for cognitive tasks, with the core cognitive processes still taking place in the human mind (Carter 2018). Writing on paper, for example, served as an extension of memory, aiding in the organization of thoughts and fostering deeper reflection.

The initial digital technologies expanded human memory and simplified the retrieval of stored information. Organizing and calculating data became more manageable, but users still needed expertise to master both the technology and the subject matter they were analyzing. The emergence of large language model (LLM)-driven platforms such as ChatGPT has captivated the public with its extraordinary capabilities, offering direct answers to specific questions, which could render search engines obsolete (Lata and Kumar 2024). Although search engines have been criticized for promoting shallow thinking by making information easily accessible (Carr 2010), they still require users to engage with and interpret the results.

By early 2023, just 2 months after its release, ChatGPT passed law exams in four courses at the University of Minnesota and a business exam at Wharton School of Business, according to professors at both institutions (Kelly 2023). This impressive performance propelled ChatGPT to an astonishing milestone of 100 million users in a two-month period. Its remarkable abilities – such as generating articles, essays, emails, jokes, poetry and job applications – demonstrated the technology's potential to transform the way we approach cognitive tasks (Milmo 2023).

The seduction of digital content can lead students to temporarily neglect their academic responsibilities (Bhardwaj and Kumar 2024). When they eventually recall these obligations, they often feel guilty and recognize that they must complete their

tasks to pass their classes. However, with the rise of advanced chatbots, many academic tasks could be taken over if schools do not implement proper safeguards. This may foster complacency and irresponsibility, as students might question the need to perform tasks that chatbots can do more efficiently – especially when similar tools are being utilized in the workplace (Nanda and Kumar 2024).

This chapter explores why learning remains essential in an era of all-knowing chatbots, where these tools are ubiquitous and ready to answer any question. It argues that having access to chatbots is akin to having expert assistance, much like the privilege enjoyed by CEOs or heads of state. However, access to expert advice does not automatically result in wise or sound decision-making (Lata et al. 2024). Ultimately, it is still our responsibility to identify the problems to be solved, determine what additional information should be provided to chatbots to guide their reasoning effectively and so on.

## 1.2. Technological cognitive enhancement

Humans often struggle to manage all cognitive processes internally, especially when tasks impose overwhelming demands. To alleviate this burden, they offload portions of their cognitive processes onto external tools, using these tools to store and organize representational information. This reduces the need for internal mental effort. For example, people take notes, type on computers or create sketches to externalize and manage their thoughts more effectively (Risko and Gilbert 2016). The use of such cognitive tools allows humans to realize that they can manage more complex cognitive processes and, in turn, accomplish more intricate tasks (Loh and Kanai 2016). This achievement also stimulates the development and utilization of various cognitive tools (Kumar and Nanda 2024).

Human civilization has progressed due to its ability to develop and utilize two types of technologies: those that enhance cognitive capacity and those that extend physical abilities, such as strengthening muscles or augmenting vision (McLuhan 1964). Tools that extend the body enable humans to lift objects they otherwise could not, travel distances in hours that once took days, and achieve what was once impossible, such as crossing oceans. Performing complex tasks requires engaging in complex cognitive processes, such as considering various factors, making decisions and bridging cognitive gaps when coordinating multiple personnel. Today, such complex cognitive processes can involve heavy use of ICT (Nayar and Kumar 2015).

Throughout history, human cognition has been supported by various technologies, ranging from spoken language and writing systems to modern ICT (Loh and Kanai 2016). Writing systems enabled humans to preserve both private

and collective memory and communicate ideas across distances and time. Even relatively simple technologies, such as printed media, played a crucial role in shaping society by facilitating the spread of new ideas (Lata and Sharma 2024b). For instance, the rise of Protestantism in Europe was closely linked to the availability of printing technology, which allowed Protestantism to capitalize on the growing vernacular print market. This surge in printed materials fueled a significant propaganda effort that shook the foundations of the Catholic church (Anderson 2006). However, printed media did not always lead to a more enlightened society; it also enabled the spread of superstitions, which could lead to harmful practices like witch-hunting, just as it could be used to combat them (Warfield 2020).

The use of paper and writing to store memories and share ideas across space and time has driven significant progress in human civilization. What once required decades or even centuries to achieve, using these memory-expanding tools has been dramatically sped up by technologies that automate cognitive processes. The automation of calculations, for example, has become indispensable in the workplace. Calculators have eliminated the need for manual calculations, and spreadsheets have further streamlined tasks by enabling users to organize, analyze and manipulate data with greater speed, ease and significantly reduced cognitive effort compared to working without such technologies.

ICT has vastly expanded and made external memory more accessible, enabling rapid retrieval of extensive information. What used to be a laborious task of locating specific phrases or sections in physical books or large libraries is disappearing with the advent of digitized versions of books. Via the Internet, we can effortlessly access both our own external memory and the collective memory of people around the world. Search engines facilitate information retrieval from virtually anywhere, but the ever-growing volume of information on the Internet requires us to carefully select and evaluate the search results.

### 1.3. From endless distraction to cognitive erosion

ICT plays a crucial role in globalizing the world market by enhancing connectivity among individuals and unifying previously fragmented markets in terms of geography and time (Bhardwaj and Kumar 2022). This connectivity intensifies competition among corporations and individuals, leading to increased cognitive strain (Colantone et al. 2019). The resultant mental fatigue creates a demand for cognitive relief or relaxation, a need that ICT helps meet (Sanz-Blas et al. 2013). Consequently, people increasingly turn to entertainment and activities that provide temporary escapes from these pressures, thereby fueling a global entertainment market heavily influenced by ICT.

Social media platforms such as TikTok and YouTube have become crucial parts of the entertainment industry. They enable both professional entertainers and amateurs to compete for audience attention, intensifying the battle for dominance in the attention economy (Ciampaglia et al. 2015). Industries such as social media, online gaming and video streaming employ advanced technologies to captivate users and maximize the time spent on their platforms (Wibowo et al. 2024). This constant influx of content can overwhelm users cognitively. However, because much of the Internet is driven by entertainment, many find pleasure in distraction rather than experiencing mental fatigue. The digital ecosystem, as a result, has eroded one of humanity's most valuable yet underappreciated skills: the ability to focus attentively and calmly on a single task or idea for extended periods (Hanin 2021).

The competition among entertainment businesses and individuals to capture audience attention extends into all market segments, including students. The negative impact of distractions from smartphones and social media is increasingly evident, as digital natives develop habits of media multitasking (Dontre 2021). Constant exposure to digital distractions can diminish students' capacity for deep thinking (Loh and Kanai 2016). Constant notifications and endless entertainment choices are breaking students' focus, causing procrastination and a lack of engagement with their schoolwork. This overload of distractions leads to poor time management and lower grades, as students find it difficult to concentrate and complete assignments effectively. Some may feel guilty and return to their studies, but they often just do the bare minimum to pass, which diminishes the value of their education.

ICT has evolved beyond expanding memory storage and retrieval; it now also assists, augments and even simulates cognitive processes to achieve cognitive goals (Ienca 2019). The rise of generative AI may weaken students' motivation to learn by offering shortcuts for tasks that traditionally require effort and practice. Chatbots, such as Google's NotebookLM, can be asked to digest long and complex texts, identifying key concepts and topics, summarizing and uncovering underlying assumptions. Critical reading has been one of the major cognitive skills nurtured in educational institutions because of its importance for intellectual development. In the past, encouraging students to read was not a significant challenge, as reading could also be a source of enjoyment (Lucantoni 2019). Writing essays, an even more cognitively demanding task, can now be effortlessly completed using ChatGPT (Livingstone 2024). These academic challenges, once fundamental to learning, can now be bypassed, diminishing the conditions that push students to engage deeply and develop critical thinking skills.

While distracted by social media or entertainment, students still need to complete their academic tasks. Despite being criticized for encouraging shallow thinking and

giving users an illusion of knowledge mastery (Carr 2010), search engines still demand that individuals read and process search results, which is why educators can tolerate such tools. However, the rise of chatbots such as ChatGPT presents new challenges, as these tools might cause students to undervalue the importance of independently writing essays (Sharples 2022; Livingstone 2024). Essay writing is crucial for developing clear communication and critical thinking skills. Although essays convey a writer's thoughts, they are not merely transcriptions of fully formed ideas (Hunt 2010). Rather, writing is an intellectual exercise involving exploration, reflection and refinement of ideas, making it essential to the learning process.

The temptation to use chatbots to complete tasks can be irresistible for students. They may not be overly concerned that relying too heavily on AI can erode the development of their critical writing and thinking skills. The danger of chatbots lies in giving the illusion of knowing everything because they can answer any question with ease, while users themselves have not developed their critical thinking skills. Additionally, these technologies can create automation bias, leading users to trust machines more than humans (Khamassi et al. 2024), including themselves, thereby weakening their intellectual autonomy.

Previous ICT tools supporting cognitive processes, such as calculation and information storage and retrieval, were not considered threats, as they were not deemed essential intellectual capabilities for humans. The ability to effectively harness these technologies to achieve cognitive goals was seen as a key determinant of one's success as a cognitive agent in an increasingly complex environment (Risko and Gilbert 2016). The development of such skills requires time and effort; mere access to technology is insufficient for becoming a proficient cognitive agent. The mastery of these technologies is considered a skill not everyone can possess, and those who do are not on the same level.

Exercise in education is not always aimed at mastering skills directly applicable to the workplace. The nature of work and how it will be done will inevitably evolve with technological advancements, making it difficult to predict the exact skills needed in the future. However, what is certainly needed to face future challenges is the ability to think critically and possess an inquisitive mind. Critical thinking helps to avoid oversimplification and biases, leading to a better understanding of complex realities. This, in turn, can enhance academic performance and reduce susceptibility to unfounded claims (Killian 2024). Similarly, an inquisitive mind fosters creativity, innovation and problem solving by encouraging a deeper, more rational approach to decision-making (Gino 2018). Additionally, curiosity promotes open communication, trust and collaboration in the workplace, resulting in improved team performance and reduced conflict.

## 1.4. Fundamental differences between chatbots and humans

Regardless of the debate over whether computers can truly think (strong AI) or merely simulate thinking (weak AI) (Wakefield 2003), what is evident is that computers, along with the algorithms they run, can effectively simulate thought. They can respond to human input in ways that often appear indistinguishable from human responses. In 2017, Yuval Noah Harari remarked, "If you have enough data, and enough computer power, then you can create an algorithm that understands humans better than they understand themselves" (Hoppen and Harari 2017). Harari's claim is evident in the operations of various e-commerce and social media platforms, whether they use conventional algorithms or AI, which can predict user behavior and target them with personalized marketing. These platforms continually monitor user activity in minute detail, generating vast amounts of data to be analyzed. By identifying behavioral patterns and preferences, they can predict and influence users' future actions, making their strategies more effective and personalized. As a result, they can pinpoint user preferences and exploit them commercially, tailoring products, services and advertisements to maximize profit based on these insights (Maulana 2019). The effectiveness of using big data, collected from users' digital activities, for personalized marketing led to the emergence of what is called surveillance capitalism (Zuboff, 2015; Maulana 2019; Wood and Monahan, 2019). However, this knowledge is narrow and highly specific, focusing on immediate commercial gains, such as the types of products that consumers buy or the content that users frequently view. It is more accurate to refer to this as data analytics technology rather than a truly intelligent system, as it lacks broader cognitive capabilities and a deeper understanding beyond pattern recognition and prediction.

In 2022, OpenAI introduced an algorithm powered by a LLM in the form of ChatGPT (OpenAI 2022), a chatbot capable of generating responses to almost any prompt, showcasing a breadth of knowledge that could appear to surpass that of any individual. However, it remains debatable whether AI – or any algorithm – can truly understand humans better than we understand ourselves, as not all aspects of human experience are captured within the digital data that can be analyzed by machines. While we can imagine AI embodied in robots interacting directly with humans in real-life environments, as seen in science fiction movies, let us limit the discussion to LLM-driven chatbots, which operate within computers and interact with users through a computer interface. Current chatbots can acquire vast knowledge that is much greater than the knowledge anyone possesses. All textual information available in the world can potentially be fed as training data, making them as knowledgeable in terms of factual and propositional knowledge as the entire human population.

Current LLM-driven chatbots differ significantly from the classic concept of AI, known as good old-fashioned AI (GOFAI), which relied on symbolic reasoning and explicit programming of rules, as noted by Hubert Dreyfus. GOFAI sought to emulate human intelligence by encoding formal logic and predefined knowledge, assuming that intelligent behavior could be achieved through the logical manipulation of symbols. After decades of effort, the research program built on the assumption that human intelligence arises from using facts and rules has reached an impasse, with no indication that it will ever achieve success (Dreyfus 1992). In contrast, LLM-driven chatbots, such as those based on neural networks, operate on a different principle: learning from vast datasets through pattern recognition rather than explicit rule-based programming. This enables them to generate responses that seem intelligent and contextually appropriate. Unlike GOFAI, which followed predefined logical rules, these models produce text based on statistical associations (Gubelmann 2024), making them more flexible but also more opaque and limited in terms of genuine comprehension. Thus, while GOFAI pursued intelligence through structured logic, LLM-driven chatbots reflect the shift in AI toward machine learning and deep learning paradigms.

In the past, GOFAI was regarded as close to human intelligence, as it operated on the premise that consciously thinking humans manipulate symbols according to certain logic or rules. However, humans often act unreflectively (Heidegger 1962; Dreyfus 1992), navigating much of their daily lives through habits – such as waking up, going to the bathroom or preparing a meal without much thought – which extends to many of their digital behaviors as well. For example, checking social media, giving "likes" to preferred posts, or reacting angrily to political opponents are often automatic actions. However, humans also have the capacity to be reflective, sometimes becoming anxious or dissatisfied with their current situation. This dissatisfaction can break habitual patterns, prompting them to seek change. This unpredictability stems from the ability of humans to envision alternative futures and consciously shape their lives. While not everyone aspires or dares to change, humans are not bound by their present circumstances. They can question their existence and reflect on their place in the world. As Heidegger might suggest, humans are Dasein – beings defined by self-awareness and the capacity to project themselves into the future, transcending their current patterns and behaviors (Heidegger 1962).

Machines, on the other hand, tend to be more deterministic, although their behavior can appear unpredictable owing to their complexity and interaction with external factors. Computers have long demonstrated superior abilities in certain cognitive tasks, such as memorization, retrieval and calculation. With the advent of LLM-based chatbots, machines can now also generate responses to complex questions and produce content such as articles – tasks that many humans find

cognitively demanding. While technological progress continues, we might imagine that AI evolves to a point where it could theoretically solve nearly any human problem or question. However, its statistical mechanism limits its capacity for the existential depth and unpredictable self-reflection that define human experience.

The current development of AI has driven tech giants such as OpenAI, Google, Meta and Microsoft to pursue artificial general intelligence (AGI) – systems that are as broadly capable as humans and able to understand, learn, and apply information across a wide range of tasks (Associated Press 2024). However, there is no consensus on what AGI will look like or its potential impact on human life. Instead of speculating on an uncertain future, it is more productive to focus on the immediate challenges posed by today's technology, particularly chatbots built on LLMs. While these systems may appear "all-knowing", they are fundamentally statistical models trained on vast datasets to approximate functions that map one set of values to another (Gubelmann 2024). For example, in machine translation, LLMs map a source-language sentence onto a target-language sentence. LLMs have gained recognition for their impressive ability to generate human-quality text, comprehend language and perform tasks such as answering questions, summarizing documents and suggesting sentence completions. A key feature of LLMs is their capacity to learn and adapt autonomously during the training process, refining their performance without direct human programming. However, their "knowledge" is not experiential but rooted in patterns derived from their training data.

Unlike humans, whose understanding is shaped by "being-in-the-world" – through experiences, perception and engagement with the world – chatbots exist solely within the confines of a computer. They cannot experience the world independently; their "knowledge" is limited to the data they are trained on and their interactions with users, lacking the experiential depth that characterizes human understanding. In Heideggerian terms, humans engage with the world directly, making sense of it through lived experiences, emotions and social interactions. This direct engagement shapes their understanding and being. Chatbots, however, lack this direct engagement. They do not see, feel or interact with the world in the human sense. Instead, their "being" is defined by algorithms and data, making them tools rather than entities with a sense of existence.

A chatbot's ontology can be seen as a manifestation of Heidegger's (1977) concept of "technology" as enframing. For Heidegger, technology reveals the world in particular ways, transforming and often concealing other modes of being. Chatbots reveal information and patterns through language, but their revelation is limited by their programming and data. They provide insights and answers but do so without the depth of understanding or intentionality that characterizes human thought.

Moreover, while both chatbots and humans can be biased by their training data, the scale is vastly different. Chatbots are trained on massive datasets, far beyond what any human could process in a lifetime. This extensive dataset allows chatbots to provide a wealth of information but also introduces the potential for biases that are embedded in the data. However, unlike static entities, chatbots can be responsive to users' feedback about bias and adapt their responses accordingly.

Current chatbots can conduct conversations that surpass human capabilities, especially in terms of their vast knowledge. However, they remain fundamentally different from humans, existing as digital entities within virtual realms, separate from the physical world where humans interact directly. What appears as "reasoning" in chatbots is actually the result of pattern recognition and probabilities, rather than genuine thinking and emotions. From a Heideggerian philosophical perspective, chatbots differ from humans in that humans may contemplate or question their own existence, whereas chatbots never regard their existence as an issue.

While computer software can be programmed to mimic emotions, it does not seem useful to make them overly emotional. Emotions such as boredom or sadness can indeed reduce the productivity of both technological and biological systems. However, when software or chatbots are designed to interact with human users, agents who experience genuine emotions, it is important to design them to exhibit empathy – responding thoughtfully and supportively – without actually experiencing emotions. Humans often attach emotions to their experiences. They may feel happiness when receiving empathetic attention and anxiety when facing threats or uncertainty, making emotional responses an integral part of their identity.

According to Heidegger, humans (or Dasein) project their lives into the future, often filled with both expectations and anxiety. As they navigate challenges and opportunities, including those shaped by technological advancements, individuals adapt based on their personal expectations. However, not everyone responds to these changes in the same way. Each person interprets their existence, challenges and aspirations uniquely. We define our own problems and interpret challenges differently, requiring specific and contextual knowledge to address them. The general knowledge stored in chatbots is not immediately applicable to personal situations. We cannot fully delegate problem solving to chatbots because our problems are shaped by our unique relationships with the world and our individual expectations. This kind of knowledge is deeply personal and contextual and cannot be fully captured by Wikipedia or any LLM.

## 1.5. What we can know that chatbots cannot

Using Merleau-Ponty's (2005) *Philosophy of Perception*, a key distinction between LLMs and humans can be highlighted: LLMs lack lived experiences and embodiment (Magee et al. 2023). Merleau-Ponty argued that perception is an active engagement with the world, grounded in our bodily presence. While LLMs such as ChatGPT simulate human subjectivity through language, they do not possess bodies or sensory experiences to inform their understanding. Their apparent understanding is derived exclusively from datasets, lacking the advantages of physical interaction or personal experience.

The absence of physical embodiment limits LLMs' ability to fully comprehend concepts such as physical pain or the joy of a warm embrace, which are deeply connected to sensory and emotional experiences. Although LLMs can generate language that appears emotionally resonant, they lack the inherent understanding derived from experiencing these events. Consequently, while LLMs can imitate human communication, they cannot replicate the profound depth of human perception and understanding, as Merleau-Ponty highlighted the crucial role of embodiment in cognition.

According to Michael Polanyi (1966, 2005), much human knowledge is tacit, meaning that it is understood and applied without being explicitly articulated in propositional terms. He argues that explicit knowledge is fundamentally based on tacit knowledge, as the process of comprehending and applying explicit knowledge depends on an underlying, often unspoken, foundation of tacit understanding. This perspective emphasizes the importance of experiential learning and personal involvement in the acquisition and application of knowledge. However, chatbots, which lack direct access to the world, are limited to propositional knowledge – the informational knowledge provided to them as training data. They do not possess tacit knowledge, which cannot be fully articulated or expressed as propositional information. As a result, tasks that require learning by doing cannot be effectively assisted by chatbots.

General LLMs, such as ChatGPT or Gemini, are trained on vast amounts of data that cover numerous topics and situations, but they do not prioritize one piece of information over another. As a result, these models often lack the contextual knowledge needed to fully understand specific scenarios. While extensive data allow LLM-based chatbots to assist in a wide range of situations, solving particular problems typically requires additional context-specific information. This means that while chatbots can help address challenges, users must provide the relevant, situated

knowledge needed for effective solutions – knowledge that is often too specific and context dependent to be fully captured by LLMs. To greatly benefit from chatbots, users must identify and provide relevant situated knowledge to them. Situated knowledge is not readily available but must be actively acquired through direct experience and understanding in particular situations. This acquisition requires intelligence and critical thinking that humans need to develop rather than relying solely on AI.

Assume that having access to chatbots is similar to having very intelligent assistance that can help humans solve any problem. However, they cannot accompany us in real-life situations because they are always confined to a computer or server and cannot observe or provide unsolicited advice such as an expert person. Therefore, to get help from chatbots, users still need to be able to formulate the problems they want to solve. Formulating problems and detailing the factors influencing them are intelligent skills that require time to nurture. It is similar to being a journalist: asking questions is an intelligent skill that differentiates the experienced from the inexperienced. The quality of the answers and the flow of the conversation depend on the skill of the questioning journalist.

While some problems are generic and can be resolved using lessons learned from datasets, such as technical issues with hardware similar to others, humans also encounter unique problems shaped by specific circumstances. Chatbots may provide solutions without considering all the relevant factors, often making different assumptions about the conditions underlying the user's problems. To ensure their suggestions are appropriate, it is crucial to understand the arguments or reasons they provide. Therefore, prompting chatbots to clarify their reasoning, assumptions and considerations they have taken into account is essential. Without this critical evaluation of chatbot arguments, users risk blindly accepting recommendations that may be misaligned with the unique nuances of their situation.

In this sense, human judgment remains indispensable – not only for refining chatbot outputs but also for safeguarding the integrity and applicability of the solutions provided. Critical thinking ensures that the recommendations we receive are not only accurate but also contextually relevant and ethically sound, reinforcing the essential role of human intelligence in the age of AI. In short, while we allow chatbots to aid our thinking, it is ultimately our responsibility to evaluate the quality of their recommendations. This is essential because chatbots lack direct access to the world where our problems emerge. They rely on us to supply contextual and accurate information as the situation develops.

## 1.6. Using chatbots to cultivate critical thinking

As discussed in the previous section, effectively utilizing all-knowing chatbots requires critical thinking abilities. The inability to assess chatbot-generated recommendations can lead to errors in decision-making and task performance (Zhai et al. 2024). Overreliance on chatbots, especially when their suggestions are accepted without scrutiny, can erode users' cognitive abilities, diminishing their capacity to think independently and evaluate information critically. Therefore, critical thinking must be even more strongly encouraged in education, as the temptation to bypass it is so great with the ubiquitous availability of chatbots.

As preventing students from using chatbots is hardly feasible, researchers are exploring ways to develop students' critical thinking abilities while they engage with technology. In a world where AI is widely used, it is increasingly important for individuals to maintain intellectual autonomy (Carter 2018) and succeed in workplaces where critical thinking remains crucial. Although the temptation to avoid deep thinking is heightened by the convenience of chatbots, Fabio et al. (2024) demonstrate that cautious, intentional use of tools such as ChatGPT, coupled with increased experience, can actually enhance critical thinking abilities. This highlights the potential of chatbots as a resource for improving students' cognitive skills. However, to achieve this goal, educational frameworks must be redesigned to incorporate the presence of chatbots. For example, chatbots can provide formative feedback, identify weak arguments and prompt students to think critically. The key is in thoughtful integration, using these tools as companions for intellectual growth rather than shortcuts for bypassing essential learning tasks (Shum 2024).

It is interesting to explore chatbots' perspectives on the necessity of education in the age of intelligent chatbots and their role in fostering critical thinking. Two questions were posed to Gemini, ChatGPT and CoPilot, and the results are presented in Tables 1.1 and 1.2.

Table 1.1 shows that Gemini, ChatGPT and Copilot assert that educating children remains essential despite the prevalence of chatbots. They emphasize that human interaction, critical thinking, creativity and social-emotional development are irreplaceable. While AI tools can enhance education by providing information and support, they cannot fully substitute the depth of learning and personal growth offered by traditional methods. Integrating AI into education underscores the importance of balancing technological advancements with core educational practices, ensuring children acquire the necessary skills to thrive in our complex, ever-evolving world. From the perspective of marketing or public relations for the

companies that create these tools, they are unlikely to present a viewpoint contrary to this.

| Prompt: With the ubiquity of chatbots like you, is educating children still necessary, and for what purpose? Provide a summarized response in one paragraph. | | |
|---|---|---|
| **Gemini** | **ChatGPT** | **CoPilot** |
| Education remains essential even in a world dominated by chatbots. While these AI tools can provide information and assistance, they cannot fully replace the need for human interaction, critical thinking, creativity, lifelong learning and ethical development. These aspects of education are crucial for children's well-being and success in a complex and ever-changing world. | Yes, educating children remains essential, even with the ubiquity of chatbots. While chatbots can provide quick access to information and assist with various tasks, education goes beyond acquiring knowledge. It fosters critical thinking, creativity, problem-solving and emotional intelligence – skills that cannot be fully developed by simply interacting with AI. Additionally, education helps children understand how to navigate complex social and ethical issues, make informed decisions and cultivate intellectual autonomy. Chatbots are tools, but education empowers children to use them wisely, ensuring they remain active participants in their learning and future decision-making. | With chatbots becoming ubiquitous, educating children remains essential. Education fosters critical thinking, creativity, emotional intelligence and social skills – qualities that AI cannot replace. It prepares children to question, innovate and understand complex concepts beyond mere information retrieval. While chatbots can support learning, the human touch in education nurtures holistic development, ensuring children grow into well-rounded individuals capable of navigating a dynamic world. Balancing AI with traditional education methods creates a more enriched learning experience. |

**Table 1.1.** *Necessity of education in the age of intelligent chatbots*

While many educators are concerned that chatbots may encourage laziness among students by making it easy to delegate the answering of difficult questions or writing essays, Table 1.2 shows that chatbots can also be designed to nurture critical thinking in students. One major challenge in current education, especially in developing countries, is that each teacher is responsible for too many students to provide sufficient attention and feedback to their individual pedagogical needs. Chatbots can be designed to facilitate thoughtful discussions with students and engage them in interactive problem-solving activities.

| Prompt: How can chatbots like you be used to nurture critical thinking in students? Provide a paragraph-long response to this query. | | |
|---|---|---|
| **Gemini** | **ChatGPT** | **CoPilot** |
| Chatbots can be used to nurture critical thinking in students by providing them with opportunities to engage in thoughtful discussions and problem-solving activities. They can ask probing questions, challenge assumptions and provide feedback on students' responses. Additionally, chatbots can be used to simulate real-world scenarios and help students practice applying critical thinking skills to complex problems. By interacting with chatbots, students can develop their ability to analyze information, evaluate arguments and draw informed conclusions. | Chatbots like me can nurture critical thinking in students by serving as interactive tools that encourage inquiry-based learning. Instead of simply providing direct answers, I can guide students to ask deeper, more reflective questions, prompting them to explore topics further and think critically about the information they receive. For example, when a student asks a question, I can present various perspectives or ask follow-up questions that challenge their assumptions, encouraging them to consider alternative viewpoints. Additionally, I can help students break down complex problems into smaller, manageable parts, guiding them through the process of analysis, synthesis and evaluation – key components of critical thinking. By fostering a dialogue rather than delivering final answers, I can help students develop the intellectual curiosity and reasoning skills necessary for independent thinking. | Chatbots like me can nurture critical thinking in students by engaging them in interactive learning experiences that prompt analytical thinking and problem-solving. For instance, I can pose challenging questions, offer diverse perspectives and encourage students to question assumptions and evaluate evidence critically. Through guided dialogue, I can help students develop their reasoning skills by asking them to justify their answers, consider alternative viewpoints and reflect on their thought processes. This interactive approach not only fosters a deeper understanding of the material but also cultivates essential critical thinking skills that are crucial for academic and real-world success. |

**Table 1.2.** *Use of chatbots to nurture critical thinking*

What is proposed above by the three chatbots has been explored by a number of researchers. Stimulating critical thinking in students by engaging them in a series of questions and answers, pioneered in Ancient Greece by Socrates, takes too much time for teachers. Additionally, students may be reluctant to engage in Socratic dialogue because they risk feeling humiliated or ashamed (Boghossian 2011). The availability of chatbots capable of engaging in Socratic dialogue can help both teachers and students (Gregorcic et al. 2024; Ma et al. 2024). The risk of feeling

humiliated by chatbots can easily be eliminated. Students can freely explore different viewpoints and question their own beliefs and assumptions – in short, chatbots can be designed to foster deep thinking and active learning (Ma et al. 2024). Teachers can observe the Socratic dialogue between students and chatbots, assess their interactions and intervene when needed (Kumar and Rewari 2022).

We can take a critical stance on the answers given in Tables 1.1 and 1.2. The above chatbots are commercial products. Even though they have attracted enthusiasm and curiosity about their potential, there are still many people who are skeptical or cautious about their potential harms, particularly in education. Hence, their developers might have taken steps to avoid their chatbots giving controversial answers or any responses that may increase people's opposition to chatbots.

Education by human teachers can never be fully replaced, but chatbots can serve as valuable complements to traditional teaching. In some instances, chatbots may even be preferred due to their constant availability and tireless ability to respond to inquiries. This benefits not only students but also teachers, who can use chatbots to practice the Socratic method by simulating interactions with them as though they were students, allowing for continuous refinement of their teaching strategies (Gregorcic et al. 2024; Rai and Lata 2024).

## 1.7. Conclusion

ICT was initially developed to ease cognitive tasks. The term "computer" itself reflects its role in offloading computation from human cognition. ICT has also replaced paper as a tool for memory expansion, offering vast storage and easy information retrieval, thereby enhancing productivity by augmenting human cognitive abilities. However, this rise in productivity has also increased competition. With ICT driving global connectivity, competition has intensified further, sometimes leaving people overwhelmed by the relentless pursuit of success and survival. The pressures of this competitive environment have, in turn, fostered a market for cognitive relaxation and temporary escapes from demanding work. Unfortunately, industries providing these services – such as music, movies, online games and social media – actively strive to keep users constantly engaged. For students, these industries pose a persistent challenge, diverting attention away from academic responsibilities.

Chatbots powered by LLMs such as ChatGPT can be a risk to education if not used wisely. They might hold students back from developing important intellectual skills. Since these chatbots can generate human-like text and handle tasks that are used to take real effort, students might become overly reliant on them. Instead of spending time on activities that build their minds, such as reading a book or writing

an essay, they might just let the chatbots do the work for them, making it harder to stay focused and avoid constant digital distractions. Relying on technology for such important intellectual tasks could weaken their critical thinking, problem-solving skills and ability to develop a deeper, more personal understanding of the world.

Humans with critical and inquisitive minds will still be needed in the age of all-knowing chatbots. Even though chatbots are trained with all available information in the world and can answer any question, they are missing two important things. First, human knowledge is either tacit or rooted in tacit knowledge, which cannot be fully articulated and hence not stored in LLMs. Second, chatbots cannot access the world directly, only through the information given by humans. While they are very good at answering general questions, their ability to solve situated problems depends on additional contextual information provided by users and the users' ability to formulate questions through iterative interactions. Hence, to address real problems, chatbots still require human users with critical and inquisitive minds.

To prepare students for a work environment where AI plays a crucial role, they need to develop critical and inquisitive minds and be trained to use AI critically to solve real-world problems. Integrating chatbots into education can provide interactive experiences, challenge assumptions, encourage deeper inquiry and offer personalized feedback. By engaging students critically with information, chatbots can help cultivate intellectual curiosity and reasoning skills.

Teachers can monitor students' interactions with chatbots and provide necessary feedback, acknowledging that different students will interact in varied ways. To ensure that the use of chatbots does not undermine the development of critical thinking, teachers should also focus on fostering creativity, emotional intelligence and social skills, which chatbots cannot emulate. By blending AI's strengths with traditional teaching, educators can create a richer, more engaging learning experience that equips students to navigate an increasingly complex world.

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