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Thinking Less in the Age of Machines: AI Overuse and Cognitive Decline

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Abstract

As artificial intelligence (AI) grows exponentially and becomes embedded in our day-to-day life, important questions emerge: is it helping us think better, or is it making us think less? This position paper explores how overreliance on AI might affect important cognitive skills like memory and critical thinking. Drawing from current empirical research, this paper asserts that while AI offers substantial benefits, it encourages users to rely on it. Further, this paper explains key concepts - cognitive offloading (the use of external means to store information) and working memory (the memory involves not only for storage but for manipulation and transformation of information). Research shows that there is a strong relationship between offloading of information to devices and declined effort to remember and reason. It also points out that while offloading can be a smart way to work efficiently, the risk lies in using AI mindlessly. In conclusion, the paper calls for a balanced approach, advocating for self- reflection and awareness, and institutional responsibility. It recommends selective and strategic offloading, retrieval-based learning, and clear AI-use policies to mitigate potential cognitive decline.

Keywords: AI overreliance, cognitive offloading, working memory

1. INTRODUCTION

It was around 2023 when AI technologies became popular. It gained even more traction as generative AI was introduced. It was all over social media, and became the talk of the town among educators and students. Among the most popular AI technologies are: chatbots e.g. Chatgpt and Copilot, virtual assistants e.g. Siri and Google assistant, and adaptive learning systems e.g. Duolingo and Kahoots. “AI is increasingly embedded in daily life” (Artificial Intelligence Index Report, 2025, p. 4). It is safe to say that people across industries and institutions may it be public or private have partly or wholly employed AI to kickstart or complete a task. Academic institutions are no exception. As a promising and novelty innovation, it is gaining roots in the classroom.

Some of the ways students use AI include: brainstorming, summarizing information, getting a quick answer to a question, improving essays, creating presentations, and helping with assignments (Freeman, 2025; Microsoft AI in

Education, 2025). Among learners, this is a welcomed innovation and is received positively (Sirirojjananan, 2023; Yilmaz et al., 2023; Bok and Cho, 2023; Ho, 2024).

Among educators, however, there is a growing concern. During the 9th Asia International Multidisciplinary Conference 2025 panel discussion, Professor Abudullah Mohd Nawi expressed concerns regarding what might be happening to his students if he himself, a reflective thinker, somehow to some degree noticed a "decreased cognitive ability" as a result of using AI for years. This resonates with the comments from Gerlich's study (2025) participants who expressed the following: "*The more I use AI, the less I feel the need to problem-solve on my own. It's like I'm losing my ability to think critically*," and "*I find myself using AI tools for almost everything—whether it's finding a restaurant or making a quick decision at work. It saves time, but I do wonder if I'm losing my ability to think things through as thoroughly as I used to*".

This is a position paper drawing on current research to explore how overreliance on AI may affect human cognition. It aims to synthesize current research on how AI overuse may diminish human cognitive abilities. It is based on the premise that although AI offers myriad benefits, its overuse promotes excessive cognitive offloading that may have negative effects on working memory and critical thinking.

This paper begins with definitions of cognitive offloading, and working memory, followed by discussions on the effects of cognitive offloading on working memory and critical thinking skills, as well as opposing views on impacts of cognitive offloading. It concludes by looking into the differences between offloading before and during the AI era, and what all these entail to individuals and educational institutions of the AI world.

2. DEFINITION

2.1Cognitive Offloading and Working Memory

Cognitive offloading refers to the use of external means like paper-and-pen, calculator, GPS, smartphone, and now the internet to store information. So, instead of holding information in mind, an individual uses these external means to store information that can be accessed any time. Hence, an individual may allot more concentration on other more mentally demanding aspects of the task.

For example, instead of holding in mind a list of items to be bought at the grocery one may rather jot them down using pen-and-paper. This way the individual may then focus more on mentally demanding tasks such as safely navigating to the location, or assessing products to buy. Nowadays, many people, especially younger generations, highly rely on AI and search engines for tasks ranging from scheduling and setting reminders to finding general information or choosing a hotel. Using the same example, AI dependent people may use an app and dictate the list of groceries to be bought; the AI will "write them down". Then, on the way to the groceries, some may use a GPS app or a built-in navigator system, or maybe the car itself is electronic and heavily AI-assisted. Further, in the grocery while choosing between two items, AI-dependent individuals may use Google search to ask for the differences between the two using voice modes. Comparing the former and latter examples, one can notice how AI-

dependent individuals may have lesser opportunities of mentally engaging on the task at hand as most tasks are assisted.

Working memory is more than just a short term memory. It is a newer concept that focuses not only on memory structure but also on memory processes and functions. This dynamic nature presented by the Baddeley-Hitch Model (as mentioned in Chai, et al., 2018) involves more than just storing, it manipulates and transforms information, thus working memory (Dosher, 2006).

For example, the ability to hold in mind grocery items while jotting them down or while you are looking for a pen and paper; or holding in mind a list of grocery items while jotting them down (or looking for a paper and pen) and engaging in a conversation at the same time. Or reading and remembering the first sentence in a paragraph while reading and understanding the rest of the sentences. Or holding in mind a question while listening to the rest of an audio. Or holding numbers in mind while performing mathematical problems. Although the working memory capacity of each individual varies, some may be able to hold more than others, it can be enhanced through proactive control and rehearsal mechanisms (Apter, 2013; Spencer, 2011).

3. DISCUSSION

3.1 Effects of Cognitive Offloading to Working Memory

It is important to note that cognitive offloading has increased over the years but more
anything, the ability to quickly finish tasks that otherwise would have taken days to complete, and the ability to retrieve information anytime and anywhere encourage strong tendencies for users to rely on it more and more. People use AI from the minutest task of checking grammar, spelling, or punctuation to generating ideas, writing, or creating codes and applications. Now people go online not only for recreational purposes, but also for mental engagement and creative expression (Kooli, 2025).

This increased cognitive offloading is significant in the equation as it has a crucial role in the decline of working memory.

In an experiment made by Grinschgl and her colleagues (2021), they found that firstly, reduced offloading resulted in lower immediate task performance but promoted more accurate memory; and secondly, offloading behavior is detrimental to memory for both immediate and subsequent memory performances.

Taking this into account, we can deduce that working memory declines as cognitive offloading increases, and reversely, working memory improves as cognitive offloading decreases. Empirical support to this claim can be found in findings on recalling information by (Eskritt & Ma, 2014; Kelly & Risko, 2019; Pyke & LeFevre, 2011; Sparrow et al., 2011; Tarde, 2023).

Further, working memory goes hand in hand with active mental processes such as focus, verbal repetition of information internally, visualization, access to long term memory, and active retrieval of information.

Additionally, working memory is strongly associated with reading comprehension (Daneman & Carpenter, 1980), logic and reasoning (Kyllonen & Christal, 1990) (Kyllonen & Stephens, 1990), and IQ scores (Engle, et al, 1999). Findings from Harvey (2025) suggest that there is a direct proportional relationship between working memory and reading proficiency. This means that working memory is not static but rather has a variable nature. It can be enhanced through mental engagement or stagnated by the lack of it. It plays a crucial role in learning and mastering new skills.

The strong association between cognitive offloading and working memory is undeniable. The issue with excessive, non-strategic cognitive offloading is that it leads to "adaptive forgetting" of unloaded information (Gerlich, 2025). An unloaded information that sits on the external environment, no or less active effort to encode them in memory, eventually becomes forgotten. At present, with AI and internet engines ready to provide information anytime, anywhere, learners become mentally passive (Abdelghani, 2023). Knowing that they have access to information at any time, the effort to actively retrieve information in memory seems unneeded. A passive mind leads to stagnant memory. Having said this, an unexercised working memory will result in reduced ability to remember and diminished critical thinking skills.

3.2 Cognitive Offloading and Diminished Critical thinking

Critical thinking refers to the ability of an individual to assess and analyze situations to form judgment (Sanders and Moulenbelt, 2011).

When generative AIs came out, people were awed at how quick, how erudite, and seemingly accurate they were. As time passed, despite precautions on their negative effects, the reality is many are using them regardless. Not surprising though, the quick answers from AI tools may provide an instant boost on the immediate task and perhaps to some extent give users false notion of being knowledgeable. However, in the long run and with excessive use and reliance, this lessens the need to think, analyze, and judge deeply as answers are readily available. In effect, critical thinking ability is weakened.

In a study made by Gerlich (2025), 666 participants of varying age groups, educational background and professional fields completed a structured survey questionnaire that included items from Halpern Critical Thinking Assessment (HCTA) tool and Terenzini's self-reported measures of critical thinking. Results showed the following: (1) increased use of AI tools is associated with lower critical thinking skills, (2) higher AI usage leads to greater cognitive offloading, and (3) as cognitive offloading increases, critical thinking decreases. Moreover, Wecks and colleagues (2024), found that non-users of Generative AI outperformed GenAI users, scoring on average 6.71 (out of 100) points higher.

This is in congruence with "Google effects", which "refers to the idea that individuals rely on the internet as a source of knowledge rather than remembering it for themselves" (Gong & Yang, 2024, p. 1). Quick responses from the internet may be deemed convincing leading internet users to offload responsibility of "remembering" information on it. And as the reliance on these technologies widen and deepen, they may begin to think that they have become adept at thinking and remembering information themselves. Further, as individuals become proficient and skilled at using these technologies, they may tend to over-estimate their own competencies (Abdelghani, et al, 2023). This perception of the internet and AI technologies as bottomless source knowledge that can be retrieved any time needed, coupled with the belief of gaining high abilities as a result of using them can lead to uncontrolled offloading, passive learning and diminished critical thinking skills.

3.3 Opposing View: Cognitive Offloading, an Efficiency Mechanism

While much research supports the negative relationship between cognitive offloading and working memory, computational model by Gilbert (2024) argues that cognitive offloading is best understood as a value-based decision-making process, rather than simply a failure or weakening of memory. It further posits that people are not losing memory ability, but making rational trade-offs: if they trust external storage, they invest less effort in memorizing the same information. It is an efficiency mechanism, not a deficit.

This paper recognizes the value of using technologies strategically to one's advantage. One may decide which to offload and which to retain in internal memory. However, we contend that for some individuals, cognitive offloading can have adverse effects on working memory: individuals who perceive these external storages as reliant and trust-worthy resulting in disabling dependency.

Grinschgl's and her colleagues' third experiment from the same study (2021), revealed that cognitive offloading has no detrimental effect on working memory which supports Gilbert's claim of offloading as an efficient mechanism. However, it is worth noting that this result was seen among participants who had an explicit goal to "acquire new memory representations". So they may have counteracted the negative effects of offloading on memory. This supports our stand that offloading to devices especially in educational settings should be supervised as not all may have the goal/motivation to learn. Also, as it is easy to fall into using technology carelessly and unawarely. As stressed by Salomon (1990), individual characteristics are significant factors when considering the effects of technology on cognition. Both Grinschgl's and Salomon's findings implicate the relevance of active engagement e.g. reflection and goal-setting, and mindful use of technology.

4. CONCLUSION

4.1 Differences in Cognitive Offloading before and during AI Era

Cognitive offloading has been used by people long before the advent of digital and AI technology. People strategically offload information to efficiently perform a task. For instance, people use maps to navigate new places, library users use card

catalogs to find books, index cards and folders to organize information for teaching or business, or use a physical calendar and planner to manage and coordinate time. Now comes the digital and AI era, individuals rely on Google maps and other GPS navigating systems for directions. All people need to do is type in the name of the place or the place coordinates which, by the way, are all readily available online. Or students can now type in the name of the book they are looking for, and the computer will locate it for them; complete with codes, aisle number, building floor number, etc. Or individuals set the date and time of events on their phone calendar application. Notification and alarm settings are available in whichever way is convenient for the individual.

We observed two main distinctions in how cognitive offloading occurs before and during the digital and AI era: one, active mental involvement; and two, the degree of reliance. Firstly, the examples above suggest that cognitive offloading before the digital and AI era required comparatively greater active mental involvement than it does today. Maps provide directional information, however, an individual needs to "read" the map, figure it out, and connect it to the topography in real time whilst driving. Whereas, with Google maps and GPS navigating systems, the mental involvement is far lesser - follow the arrow and listen for further instructions or information. Finding books before the digital and AI era, includes browsing through hundreds of catalogs arranged alphabetically, reading the catalog, and figuring out where it is in the library, and reading through the arrays of books to get to that one particular location. Secondly, the reliance on today's external environment is far greater than before, sometimes accepting it without question. In a study made by Freeman (2025), 18% of the participants revealed that they include AI-generated content directly to their work. In the classroom, as observed and experienced by educators, many students use AI-generated text verbatimly. These demonstrate high-level reliance and misuse of digital and AI technologies.

This is not to say that digital and AI technologies are unwelcome; they in fact have been helpful and convenient in so many ways. They are not going away; and they will certainly shape our future. This being said, there is clear evidence of its overuse, and its inimical relationship with working memory and critical thinking. Bai, et al, 2023; Akgun & Toker 2024 believe that misuse of AI can lead to cognitive decline in the long term; and detrimental to working memory and critical thinking skills development (Tarde, 2023).

In this AI world, learners and educational institutions play a more crucial role than ever before.

4.2 The Burden Lies on the Individual and Educational Institution

Considering what we know about working memory, critical thinking and how these are affected by excessive cognitive offloading, individuals and educational institutions have now on their shoulders a huge responsibility of mitigating possible negative effects of digital and AI technology overuse.

Although the current technologies are pulling us away from what now seems to be "traditional methods", for instance using pen and paper, and activities requiring routine

memorization, it is essential to retain some of the basics, or employ the basics and strategically supplement them with technologies.

Individual

- Exercise your mind. Memory is very much like muscles that need to be worked out to develop. In an experiment made by Agarwal and her colleagues (2017), they found that students with both lower and higher working memory capacity learned more when they practiced retrieval compared to restudying. Further, when assessed two days after, students with lower working memory capacity benefited more when they practiced retrieval compared to restudying. So, instead of simply re-reading and highlighting notes, intentionally recall them.

- Offload selectively and strategically with the intention of not only maximizing immediate performance but also improving one's memory for subsequent tasks. Individuals must consciously make decisions of what to remember internally and store externally. There must be an intentional choice to think rather than rely on external stored information (Salomon, 1990, mentioned in Grinschgl, et al., 2021).

- Adapt a questioning mindset. Nowadays, AI has answers to everything; question the information, verify and re-verify it.

- For parents to be vigilant on their children's use of digital and AI technology for school work and for general use. There is a rising number of digital addiction among children, especially those having their own mobile phone and/or computer (Oktay and Ozturk, 2024). An experiment by Armitage and colleagues (2020) showed that even young children have the propensity to use external tools as aid. And although strategic offloading increases with age, children need supervision on when to offload and when not to, and how to use digital tools to promote mental proficiency and critical thinking.

Educational institutions

- For teachers to regulate internet and device usage in the classroom. Learners need guidance in navigating through learning with AI as a tool; it is easy to fall into using it as a replacement rather than a partner.

- Despite technological advancement, classics like recall activities, paper-and-pen quizzes and note-taking, or think-pair-share are still valuable.

- For institutions to lay out strong, clear policies on AI usage across all levels of education. Many students have been using Chatgpt, Grammarly, and Microsoft CoPilot (most commonly used tools) to search for information, check grammar, summarize and paraphrase documents and yet expressed inadequacy in terms of confidence and knowledge of AI (Digital Education Council, 2024). The danger with this situation is that it can result in mindless, misuse, and overuse of technology.

- AI literacy is a must not only for students but more so with educators who are the navigator in all these.

AI technology must be treated as a tool, a means, an aid to augment our cognitive limitations. It must not in any way replace the human mind, however, this might not be far from happening if we let it. Thus, AI literacy is key; understanding one's mental capacity is crucial; and a strong, clear AI framework policy is a must to set boundaries between human cognition and AI use. In the age of machines, we must be thinking more critically, more vigilantly.

REFERENCES

Abdelghani, R., Sauzéon, H., Oudeyer, P.Y. (2023). Generative AI in the Classroom: Can Students Remain Active Learners?. *arXiv:2310.03192v2*. https://doi.org/10.48550/arXiv.20.03192

Agarwal, P., Finley, J., Rose, N., Roediger, H. (2017). Benefits from retrieval practice are greater for students with lower working memory capacity. *Memory*. 25(6):764-771. doi: 10.1080/09658211.2016.1220579

Apter, B. (2013). Improving working memory. *Educational Psychology in Practice* 29(1). http://dx.doi.org/10.1080/02667363.2012.759426

Armitage KL, Bulley A, Redshaw J. 2020 Developmental origins of cognitive offloading. *Proc. R. Soc. B* 287:20192927. http://dx.doi.org/10.1098/rspb.2019.2927

Bai, L., Liu, X., & Su, J. (2023). ChatGPT: The cognitive effects on learning and memory. Brain-X, 1(3), e30. https://doi.org/10.1002/brx2.30

Blauth, TF., Gstrein, OJ., Zwitter, A. (2022). Artificial Intelligence Crime: An Overview of Malicious Use and Abuse of AI. IEEE Access, 10:1-1. DOI: 10.1109/ACCESS.2022.3191790

Bok, E., & Cho, Y. (2023). Examining Korean EFL college students' experiences and perceptions of using ChatGPT as a writing revision tool. STEM Journal/Yeongsang Yeong'eo Gyoyug/Journal of English Teaching Through Movies and Media, 24(4), 15–27. https://doi.org/10.16875/stem.2023.24.4.15

Chai WJ, Abd Hamid AI, Abdullah JM. (2018). Working Memory From the Psychological and Neurosciences Perspectives: *A Review. Front Psychol*, 9:401. doi: 10.3389/fpsyg.2018.00401. PMID: 29636715; PMCID: PMC5881171.

Daneman, M., & Carpenter, P. A. (1980). Individual differences in working memory and reading. *Journal of Verbal Learning and Verbal Behavio*r, 19, 450-466. https://doi.org/10.1016/S0022-5371(80)90312-6

Dede, C. (2010). Comparing frameworks for 21st-century skills. *In J.A. Bellanca & R. Brandt (Eds.), 21st Century Skills*.

Digital Education Council. (2024 August 2). Digital Education Council Global AI Student Survey 2024. https://www.digitaleducationcouncil.com/post/digital-education-council-global-ai-student-survey-2024

Dosher, B. (2003). Working Memory. *Encyclopedia of Cognitive Science*, 4, 569–577. https://doi.org/10.1002/0470018860.s00575

Engle, R. W., Tuholski, S. W., Laughlin, J. E., & Conway, A. R. A. (1999). Working memory, short-term memory, and general fluid intelligence: A latent-variable approach. *Journal of Educational Psychology*, 130(3):169-183. DOI:10.1037/0096-3445.128.3.309

Eskritt M., Ma S. (2014). Intentional forgetting: Note-taking as naturalistic example. *Memory & Cognition*, 42, 237–246. https://doi.org/10.3758/s13421-013-0362-1

Freeman, J. (2025). Higher Education Policy Institute. *Student Generative AI Survey 2025* (HEPI Policy Note 61). https://www.hepi.ac.uk/2025/02/26/student-generative-ai-survey-2025/

Gerlich, M. (2025). AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies*, *15*(1), 6. https://doi.org/10.3390/soc15010006

Gilbert, S. (2024). Cognitive offloading is value-based decision making: Modelling cognitive effort and the expected value of memory. *Elsevier B.V.*, 247 (2024) 105783. https://doi.org/10.1016/j.cognition.2024.105783

Gong, C., & Yang, Y. (2024). Google effects on memory: a meta-analytical review of the media effects of intensive Internet search behavior. Frontiers in Public Health, 12. https://doi.org/10.3389/fpubh.2024.1332030

Grinschgl, S., Papenmeier, F., & Meyerhoff, H. S. (2021). Consequences of cognitive offloading: Boosting performance but diminishing memory. *Quarterly Journal of Experimental Psychology*, *74*(9), 1477-1496. https://doi.org/10.1177/17470218211008060

Harvey, J. (2025). Exploring the Impact of Working Memory Capacity on Academic Reading and Achievement in South African Online Tertiary Students, Reading Psychology, 46:3, 271-293, DOI: 10.1080/02702711.2024.2447228

Ho, P. X. P. (2024). Using ChatGPT in English language learning: A study on I.T. students' attitudes, habits, and perceptions. International Journal of TESOL & Education, 4(1), 55-68. https://doi.org/10.54855/ijte.24414

Kelly M. O., Risko E. F. (2019). Offloading memory: Serial position effects. *Psychonomic Bulletin & Review*, 26, 1347–1353. https://doi.org/10.3758/s13423-019-01615-8

Kooli, C., Kooli, Y., Kooli, E. (2025). Generative artificial intelligence addiction syndrome: A new behavioral disorder? *Asian Journal of Psychiatry*. Volume 107, 104476,ISSN 1876-2018, https://doi.org/10.1016/j.ajp.2025.104476.

Kyllonen, P. C., & Christal, R. E. (1990). Reasoning ability is (little more than) working memory capacity. Intelligence, 14, 389-433. https://doi.org/10.1016/S0160-2896(05)80012-1

Kyllonen, P. C., & Stephens, D. L. (1990). Cognitive abilities as the determinants of success in acquiring logic skills. Learning and Individual Differences, 2, 129-160. https://doi.org/10.1016/1041-6080(90)90020-H

Nawi, A.M. (2025 May 14-15). The 9th Asia Multidisciplinary International Conference 2025. Rajamangala University of Technology Srivijaya.

Ngo, T.T.A. (2023). The Perception by University Students of the Use of ChatGPT in Education. International Journal of Emerging Technologies in Learning (iJET), 18(17), 4–19. https://doi.org/10.3991/ijet.v18i17.39019

Oktay, D.; Ozturk, C. (2024). Digital Addiction in Children and Affecting Factors. *Children*, 11, 417. https://doi.org/10.3390/children11040417

Pandey, P., Singh, T., & Kumar, S. (2023). Cognitive Offloading: Systematic Review of a Decade. *The International Journal of Indian Psychology*, 11(2): 2348-5396. DOI: 10.25215/1102.163

Pyke A. A., LeFevre J.-A. (2011). Calculator use need not undermine direct-access ability: The roles of retrieval, calculation, and calculation use in acquisition of arithmetic facts. *Journal of Educational Psychology*, 103, 608–616. https://doi.org/10.1037/a0023291

Risko E. F., Dunn T. L. (2015). Storing information in-the-world: Metacognition and cognitive offloading in a short-term memory task. *Consciousness and Cognition*, 36, 61–74. https://doi.org/10.1016/j.concog.2015.05.014

Salomon, G. (1990). Cognitive effects with and of computer technology. Communication Research, 17(1), 26–44. DOI:10.1177/009365090017001002

Sirirojjananan, T. (2023). Thai High School Students' Perception Toward the Use Of Chatgpt In Efl Classes. *Master of Arts In English Language Teaching Language Institute Thammasat University*. https://ethesisarchive.library.tu.ac.th/thesis/2023/TU_2023_652104236 3_19106_28441.pdf

Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. *Science*, 333(6043), 776–778.

Spencer, L. (2011). "Strategies to Improve Working Memory in the Classroom" (2011). *Education Masters.* Paper 73. https://fisherpub.sjf.edu/education_ETD_masters/73

Stanford University Human-Centered Artificial Intelligence. (2025). *Artificial Intelligence Index Report 2025*. https://hai.stanford.edu/ai-index/2025- ai-index-report

Tarde Y, Joshi P. (2023). A Study of Effect of Cognitive Offloading on Instant Performance and Metamemory in ShortTerm Task. *Indian Journal of Behavioural Sciences*. 2023;26(2): 85-94. doi: 10.55229/ijbs.v26i2.03

Ward, A. F. (2013). Supernormal: How the internet is changing our memories and attention spans. *Journal of Applied Research in Memory and Cognition*, 2(4), 231–234.

Wecks, JO., Voshaar, J., Plate, BJ, Zimmermann, J. (2024). Generative AI Usage and Exam Performance. arXiv:2404.19699v3. https://doi.org/10.48550/arXiv.2404.19699

Yilmaz, H., Maxutov, S., Baitekov, A., & Balta, N. (2023). Student Attitudes towards Chat GPT: A Technology Acceptance Model Survey. International Educational Review, 1(1), 57-83. https://doi.org/10.58693/ier.114