# GenAI and Effective Reading Among University Students: Prospects, Challenges, and Future Directions

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**Abstract:**

The rapid development of Generative Artificial Intelligence (GenAI) has significantly influenced university students' reading habits, with both positive and negative implications. While there have been increased use of GenAI among university students, some scholars relate its use with negative impacts regarding students reading habits while others relate it with positive. It is against this backdrop that the present study was carried out to explore prospects, challenges and future directions of GenAI in the developing effective reading amongst university students. The study employed systematic review of literature. Findings revealed that GenAI presents both prospects and challenges for students' effective reading. Prospects include improved accessibility, convenience of reading, personalized reading resources and interactive reading. Regarding challenges, the study found that GenAI can potentially create students' overdependency on it. In addition, there are potential biasness and inaccuracies of AI algorithms that can lead to a generation of biased reading contents. The system can also lead to breach of data privacy and it is resources intensive. Although the study established both prospects and challenges of GenAI in enhancing reading, most of the challenges are manageable. Provided that appropriate measures are implemented it can be reasonably concluded that the prospects outweigh its challenges. It was, further, found that future directions of AI in developing reading environments involve integration of AI with virtual reality, diminished human-human interaction, human-AI integration, and lifelong learning. The study calls for universities to institute and operationalize students' data governance and protection policies, among other recommendations.

## Introduction

Reading culture has roots in pre-colonial times, when word-of-mouth was the primary method of transmitting knowledge from one generation to the next. Most often, riddles, folk music, storytelling, and conversation were used (Madonsela, 2020). However, the formal colonial education introduced reading and writing activities through classroom systems because of modernization (Woolman, 2001). Consequently, as said by Mustafa et al. (2021), readers visit libraries and other information institutions to read printed books to acquire knowledge, up to date information, and strengthen their reading and writing skills.  Basically, reading is viewed as a traditional activity that involves using a book, and other written materials. Mustafa et al. (2021) consider reading as a practice that helps people become more creative and strengthens their critical thinking skills. According to Okolo and Ivwighreghweta (2020) regular reading is a valuable tool for people's mental and personal development. Societies that place greater emphasis on reading are characterized by advanced economic development, social progress, political advancement, and other societal growth markers (Odunayo, 2021).

In universities, reading habits promote academic performance, enhance independent thinking, self-confidence and develop the intellectual ability of students (Wema, 2018). Akinola (2021) linked reading with academic performance

of students. That is to say, reading and success of university students are interdependent. When it becomes part of life, reading culture develops positive attitudes and critical thinking abilities (Sotiloye & Bodunde, 2018). Reading is essential for keeping students updated, enhancing their insights, and fostering an open mindset. It further, promotes the creative thinking and lifelong learning skills (Bulgurcuoglu, 2016). Hence, reading culture of most students have started to change from the traditional reading methods to a more sophisticated way using internet (Yusof, 2021).

Some of the technologies that are used by university students in facilitating learning include the use of generative artificial intelligence (GenAI). According to García-Peñalvo and Vázquez-Ingelmo (2023) GenAI process large data sets, identify patterns, and subsequently generate original content in the form of text, images, videos, and even computer code, all in accordance with the provided directives. According to the authors, ChatGPT, Dall-E, and Midjourney are examples of GenAI. Saúde et al. (2024) added that GenAI uses deep learning models to produce fresh, unique information. These models learn to produce new material that is like but distinct from the training data after being trained on vast volumes of pre-existing data, including text, photos, music, and other types of media. The quality and applicability of shared information are enhanced by generative AI, which is essential for promoting knowledge exchange. Its sophisticated features make it possible to create a variety of information, such as text, photos, video, audio, and code, increasing the opportunities for knowledge dissemination (Baidoo-Anu & Ansah, 2023). The distinction between human and machine generated content can be blurred by the wide range of potential uses for these tools, which include language translation, improving already-existing language processing tasks, creating original content, responding to enquiries, offering tutoring, and helping students with tests, essays and quizzes (Gruenhagen et al. 2024).

Despite its many uses, GenAI can be easily abused when used as an authoring tool in apps like ChatGPT. While students who have previously engaged in deliberate academic dishonesty through contract cheating or paper mills are unlikely to be deterred from using ChatGPT or other GenAI tools, other students will require instruction on how to prevent unintentional cheating (Barret & Pack, 2023). Universities have been more impacted than any other industry by the development and use of AI (Hashmi & Bal, 2024). The development of science and technology has changed the way students approach reading, as the majority prefer consulting digital sources of reading materials (Yusof, 2021). University students around the world are now using GenAI for various academic activities such as constructing text, images, photos, audio, and others. The literature consulted has demonstrated that GenAI offers several benefits among university students in their learning process. Nevertheless, the use of GenAI has implications on students reading culture, as most of them depend on such technologies, of which others cannot perform similar or related tasks without them. According to Sotiloye and Bodunde (2018), however, reading in many university communities is rapidly becoming less popular due to the widespread of these modern technologies, which have significantly diminished effective reading. Akidi et al. (2021) added that university students' reading habits are in danger due to the increased use of technologies. But on the other side, scholars such as Odunayo (2021) states that ICT advancements can be used to enhance reading in universities by providing students access to vast amounts of electronic resources and databases. It is against this backdrop that the present study aimed at exploring the prospects, challenges and future directions of GenAI in the developing effective reading for university students.

## Literature Review

The use of artificial intelligence such as GenAI has raised significant concerns on the reading culture of the university students around the world. In fact, as said by Giannini (2023) and Massaty et al. (2024), GenAI technologies are being incorporated into educational settings without a clear understanding, guidelines, or controls. To better understand these dynamics and provide more functional guidelines for the ethical and responsible integration of GenAI technologies into the educational setting, more research and discussion are required (Yusuf et al., 2024). According to Jochim and Lenz-Kesekamp (2024) students typically have less experience with AI, are more sceptical about it, and are less inclined to use it in higher education. Therefore, this necessitates a determined effort to raise awareness and gain an understanding of GenAI's potential and constraints in the context of higher education (Saúde et al., 2024). AI is changing education in several ways, including improved virtual learning, administrative automation, and personalized learning. There are practically endless opportunities for the use of AI technology in education due to its continuous development (Wang'ang'a, 2024).

Zhou (2024) affirms that GenAI technology may produce learning materials that are customised to each student's needs and skill level, including explanations and practice questions. Chan and Hu (2023) stated that it is important that students acquire AI literacy, which involves knowing the fundamentals of GenAI, how it operates, its benefits, and the associated risks in higher education. In the meantime, they should make sure that their usage of GenAI is in line with moral standards and does not negatively impact society. McDonald et al. (2024) argue that while GenAI offers significant benefits, it requires greater scrutiny in educational settings. Its integration is reshaping assessment and evaluation methods, promoting sustainability while raising ethical considerations regarding justice and fairness.

To prevent potentially incorrect or misleading information, instructors and students should not rely solely on AI-generated writing, especially when the content is outside of their area of expertise (Nikolopoulou, 2024). Instructors must recognise and control students' use of AI because it's an attractive enemy of academic dishonesty by reason of its versatility, which includes the ability to solve problems and generate content. This use calls into doubt the validity of students work, undermining the basis of academic honesty (Ardito, 2024).

In responding to the ethical concern, Hashmi and Bal (2024) alluded that to ensure proper use of GenAI, it should involve educating students on the ethical implications of AI, when and where to utilise AI technologies, and how to use AI responsibly and transparently. Similarly, Magrill and Magrill (2024) where the opinion that to ensure that students are well-versed in using GenAI to solve complicated problems in a variety of sectors rather than perpetuating them, a new literacy is necessary to prepare them to traverse a world that is becoming more and more influenced by these technologies. Farrelly and Baker (2023) highlighted that AI literacy is starting to take shape, encompassing everything from the functionalist level of knowledge and skill acquisition to the point were making a critical analysis of the implications of AI is encouraged. Chen (2023) avers that different people use ChatGPT and generative AI for various reasons, for example, students use it more frequently in higher education. According to Higgs and Stornaiuolo (2024) young people utilise GenAI consciously and purposefully for a variety of writing tasks both inside and outside of the classroom. These include helping them with everyday informational and organisational tasks, entertaining themselves by using AI technology to create creative works, and stimulating their writing and mental processes. Higher education institutions (HEIs) have been using AI more widely and successfully, but in the past, its uses were limited to extensive educational tasks like automated administration and grading. The development of ChatGPT, a Chatbot created by Open AI in November 2022, led to the recent penetration of individual and small-scale applications into HEIs (Yusuf et al., 2024). Significant advancements in the educational system have been made possible by the application of AI. The development of teaching assistants' robots, AI-based smart classrooms, and English assistance, among other things, have made it possible to realise the education sector's main goal and ambition of creating an intelligent system (Dong et al., 2024).

However, there are concerns with academic integrity when integrating GenAI tools, especially when it comes to plagiarism and the veracity of content produced by AI (Batista et al., 2024). Student practices regarding the usage of GenAI in academic work appear unethical; students who frequently utilise GenAI content conceal it to avoid facing penalties from their instructors (Mireku et al., 2024). For example, a study conducted in Palestine by Hamamra et al., (2024) revealed that some students who are tech-savvy emphasized that they used ChatGPT and their writings were not detected as plagiarism by Turnitin. Chen and Zhu (2024) agree that there are risks associated with using ChatGPT in a variety of contexts, including the classroom and larger social applications. Initially, many students expressed concern about the possible misuse of AI in educational environments, particularly for those who would not have the chance to learn and comprehend how to utilise AI appropriately because they lack access to high-quality resources. As a result, depending exclusively on GenAI technologies for higher education might not be able to satisfy students' need for in-depth knowledge, critical thinking, and guidance disciplines (Michel-Villarreal, 2023). These restrictions mirror the present challenges of GenAI in technical and educational settings, where machine-generated content is currently unable to match the complexity of human judgement and domain-specific knowledge (Dai, 2024). Other disadvantages of using Gen AI in academic setting, are bias in responses, lack of oral language and nonverbal cues, inaccurate information based on outdated data, limited comprehension of the material, cheating and plagiarism, which restrict critical thinking, stifle creativity, and promote laziness (Evmenova et al., 2024).

## Research Method

The study was based on a systematic review of literature. The literature that was used included journal articles, conference proceedings, reports, books, case studies, and informational web contents related to prospects, challenges and future directions of GenAI in developing effective reading among university students. To obtain studies for review, a thorough search was conducted. Searching was conducted in databases including DOAJ, AJOL, Google Scholar, JSTOR, EBSCO, and Web of Science. Searching was also done to obtain publications from other sources including related informational websites. The search included key phrases related to AI and its impact on university students' reading habits. The phrases included "Artificial Intelligence" AND "university students" OR "prospects for reading" OR "limitations for reading" OR "future directions". The searching was limited to only English articles published within the past five years. In total, 167 articles were identified—148 from databases and 19 from other sources. After removing duplicated articles, a total of 98 remained. 21 articles were deemed irrelevant and excluded. After thorough screening of the remaining articles, 31 were excluded because the study couldn't retrieve them in full. 46 full-text articles were eligible for analysis. However, 7 were excluded due to technical issues. Thus, the final number of studies that were included in the review was 39 as summarized in a PRISMA framework in Figure 1.
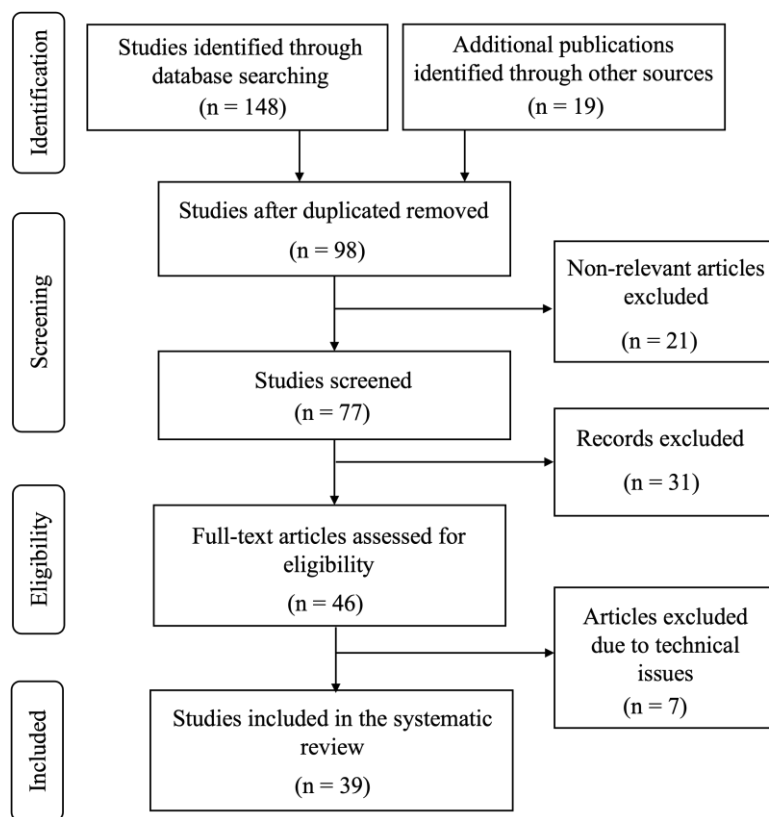
Figure 1. PRISMA Framework

## Findings and Discussion

### Result

This study collected data from 30 respondents to assess their self-efficacy in performing ten robotics-related tasks, providing insights into their confidence levels and identifying potential areas for instructional improvement. These tasks, central to the assessment, were designed to measure the respondents' confidence and perceived capability to successfully perform specific robot-related activities. Each task was represented as an item within the RSE scale. The descriptive statistics for these RSE items are presented comprehensively in Table 3, summarizing key metrics such as the mean, standard error of the mean (SEM), standard deviation, and variance scores for each item. These statistics provide valuable insights into the distribution of responses, highlighting patterns in self-perceived competencies among participants. By examining these descriptive data, we gain a deeper understanding of variations in respondents' self-efficacy across different robotic tasks, thereby setting the stage for further analysis of factors influencing individual confidence in robotics.

Table 1. Prospects, challenges and future directions of GenAI application in reading

| Theme | Sub-themes | Source |
|---|---|---|
| Prospects of GenAI in developing reading environments | Accessibility of reading resources | Young and Shishido (2023); Aithal and Aithal (2023); Mazumdar (2023) |
| | Convenience of reading | Kamalov et al. (2023); Alam and Hasan (2024); Appen (2022); Bookt (2023) |
| | Personalized reading resources | Xiao (2023); Aithal and Aithal (2023); Mazumdar (2023); CO/AI (2024) |
| | Interactive reading | Venkateswari (2024); Xu et al. (2021); Gan and Loh (2024); Liu et al. (2022); Burriss and Leander (2024) |
| | Overdependency on AI reading assistants | Sirghi et al. (2024); Zargaran et al. (2020); Watkins (2024); Jie and Kamrozzaman (2024) |

| | | |
|---|---|---|
| Potential challenges of GenAI in developing reading environments | Potential biasness and inaccuracies of AI algorithms | Pattyam (2020); Maedche et al. (2019); Kamalov et al. (2024); Watkins (2024) |
| | Data privacy and security | Vaza et al. (2024); Kamalov et al. (2023); Huang (2023) |
| | Limited resources and technical infrastructures | Kamalov et al. (2023); Hannan and Liu (2023); Venkateswari (2024) |
| Future directions | Integration of AI with virtual reality | Alam and Hasan (2024) |
| | Diminished human-human interaction | Preiksaitis and Rose (2023). |
| | Human-AI integration | Virvou (2022) |
| | Lifelong learning | Jie and Kamrozzaman (2024) |

## Prospects of GenAI in Enhancing Reading

### Accessibility of Reading Resources

The study found that GenAI enhances the reading environment by offering immediate access to a diverse selection of reading materials, in contrast to conventional libraries. For instance, a study conducted by Young and Shishido (2023) assessed the capabilities of ChatGPT in improving access to reading resources, discovered that the tool can generate simplified versions of reading content. Furthermore, Aithal and Aithal (2023) identified that AI grants students access to an extensive range of information and resources, including articles and books across multiple fields and domains. This capability allows students to easily locate information on a broad spectrum of subjects without the necessity of physically search through numerous books or articles.

Furthermore, artificial intelligence can be accessed from any location with an internet connection, rendering it an exceptionally accessible resource for information. This feature is especially beneficial for students who lack access to a physical library or need quick access to information (Aithal and Aithal, 2023). In relation to the accessibility of reading materials, Mazumdar (2023) addressed this issue from a linguistic perspective. While traditional libraries house books and other resources in their original languages, GenAI is equipped with language translation capabilities that allow users to access reading contents in their preferred language. This functionality significantly enhances access to reading materials that would otherwise be inaccessible in conventional libraries.

### Convenience of Reading

Research indicates that GenAI enhances the convenience of reading in multiple ways. For instance, it has been demonstrated that AI provides immediate access to a wide range of digital library resources, allowing readers to obtain information effortlessly on their devices without the burden of transporting physical books (Kamalov et al., 2023). This advancement has significantly made access to reading materials more convenient. Furthermore, with the help of Natural Language Processing (NLP) models, AI is capable of translating the text from one language to another, thus facilitating access to literature in languages that may not have been offered in traditional print formats (Alam and Hasan, 2024).

Additionally, AI incorporates functionalities that enable users to adjust screen brightness or enlarge the font size of the text they are reading. This enhancement facilitates a more accessible reading experience, particularly for students with visual impairments (Appen, 2022). Similarly, the article by Bookt (2023) emphasized that digital tools, particularly AI applications, typically include features that enhance reading convenience. For instance, most of these tools enable users to adjust font size, line spacing, and background color, thereby facilitating a more comfortable reading environment. Additionally, some platforms provide interactive functionalities such as highlighting, note-taking, and dictionary lookups, which can significantly enhance reader engagement with the material. Moreover, virtual assistants powered by AI can read text aloud providing assistance to students who may struggle with reading or those who wish to perform other tasks simultaneously while reading.

### Personalized Reading Resources

Studies indicates that artificial intelligence plays a crucial role in facilitating personalized reading resources for students. For example, a study conducted by Xiao (2023) demonstrated that AI tools like ChatGPT can gather interactive data from readers, assess their interests, and develop engaging and high-quality activity programs aimed at increasing reader participation and enhancing the effectiveness of reading. In a similar vein, Aithal and Aithal (2023) noted that ChatGPT is capable of offering personalized suggestions tailored to a students' interests and previous search behaviors, thereby aiding them in uncovering new information sources pertinent to their reading preferences.

Additionally, Mazumdar (2023) highlighted that AI-driven algorithms provide customized reading recommendations by evaluating user preferences, reading history, and contextual elements to propose books that resonate with individual tastes. Furthermore, an article by CO/AI (2024) emphasized that ChatGPT and comparable AI models can deliver personalized book suggestions based on a reader's interests, reading history, and specific requirements.

### Interactive Reading

Interactive reading is defined by scholars such as Merga (2017), Lennox (2013), and Barrentine (1996) as a process where adults engage with children in reading activities to enhance the children's comprehension of various concepts. However, interactive reading is not limited to adult-child interactions; it can also be effectively employed by adults, including university students, through initiatives like book clubs, where groups of readers engage in discussions about the material they have read (Gan and Loh, 2024). Strategies such as reading aloud, repeated reading, shared reading, and guided reading make interactive reading a vital method for improving students' understanding of various subject matters (Kulo et al., 2019).

Artificial intelligence, through tools like chatbots, interactive story telling apps, augmented reality books, and voice enabled reading assistants, offers interactive reading experience to readers (Liu et al., 2022). Venkateswari (2024) added that AI can act like human reading companions to accompany them and provide affective supports for an active reading. Gaining knowledge on the contextual information triggers the interest of the readers. Engagement in reading activities among students may be influenced by their interactions with chatbots, as these digital tools can offer prompts that encourage students to reflect on the narratives they are exploring (Xu et al., 2021). Furthermore, chatbots can function as human-like reading companions, providing emotional support that fosters active reading (Liu et al., 2022). Burriss and Leander (2024) contended that AI algorithms significantly influence the reading habits of individuals, including the engagement with supplementary materials, the exploration of various texts, the adoption of a critical viewpoint, the creation of counter-texts, and the pursuit of social action.

## Challenges of GenAI in developing effective reading

### Potential Overdependency on AI Reading Assistants

Research indicates that while artificial intelligence offers significant advantages to readers, there exists concerns regarding its challenges. According to Sirghi et al. (2024) for example, as a result of using AI to support reading, students may become excessively dependent on it, thereby overlooking traditional reading methods. As suggested by Zargaran et al., (2020), it is crucial to strike a balance between technological utilization and conventional reading practices to promote comprehensive learning experiences. Similarly, Watkins (2024) indicated that if students excessively rely on AI reading assistants, their capacity and motivation to engage deeply with texts could be diminished. The consequences of this trend may extend throughout society for generations. A lack of skilled critical readers poses the danger of cultivating individuals who readily accept simplified information without questioning, analyzing from various perspectives, or forming their own interpretations.

Reflecting on the same, Jie and Kamrozzaman (2024), Matto (2024) and Mutanga et al. (2024) cautioned that excessive dependence on AI may result in student isolation, diminished social engagement, and a decline in the role of educators in the teaching process, thereby raising issues related to lifelong learning and ethical considerations. This concern may explain why Watkins (2024) contended that the irresponsible implementation of AI for reading purposes poses a greater risk to knowledge acquisition and learning than utilizing AI for writing assistance.

### Potential Bias and Inaccuracies of AI Algorithms

The majority of artificial intelligence systems are built using machine learning algorithms that are trained on existing datasets. Various techniques facilitate the algorithms' ability to learn from data and enhance their performance (Pattyam, 2020). Maedche et al., (2019) note that when the training data contain biases, the machine learning algorithms may adopt these biases, thereby maintaining them and resulting in a continuation of biased outputs. Kamalov et al., (2024) added that AI models, being trained on publicly available data, may encounter the biases that are prevalent on the internet. This occurrence may happen even if it against the intentions of the developers of AI system or the readers. Consequently, Watkins (2024) contends that AI-generated outputs could enable the spread of misinformation and weaponized narratives. In a related discussion, Kamalov et al., (2023) assert that AI tools may demonstrate bias towards specific linguistic or cultural groups, which can impact students from varied backgrounds. Watkins (2024) noted that discussions surrounding AI systems frequently emphasize the speed of their operations rather than the processes involved, their significance, and their accuracy. Consequently, there is often a lack of attention to the frequency with which AI systems overlook essential information within documents, leading to the potential for misinforming readers.

**Data Privacy and Security**

AI technologies used in educational settings involve ongoing data collection aimed at enhancing learning processes (Vaza et al., 2024). Some AI applications such as interactive reading programs, necessitate the collection of students' personal information (Vaza et al., 2024; Kamalov et al., 2023; Huang, 2023). For example, understanding that a student faces specific reading difficulties enables AI to tailor its methods and adapt the content to better suit their needs (Kamalov et al., 2023). Further, personal student information encompasses data remnants generated during the reading process, such as browsing history, download history, geographical location, and behavioural preferences, all of which can be extracted (Huang, 2023). Although the utilization of students' personal data can yield significant advantages, it also raises concerns regarding privacy and security (Kamalov et al., 2023).

The right to privacy is essential for safeguarding human dignity, autonomy, and agency, as highlighted by Huang (2023). Studies further indicate that breaches of student privacy pose significant risks to their reading activities. For instance, Vaza et al., (2024) pointed out that the invasion into students' privacy may create a sense of constant monitoring, which can hinder their ability to freely explore and participate in the learning environment. Additionally, such monitoring can induce stress or anxiety if students feel that their every action is being kept under surveillance and evaluated.

**Limited Resources and Technical Infrastructures**

The implementation of GenAI systems for personalized learning often necessitates considerable investments in technology, infrastructure, and ongoing professional development. Unfortunately, not all educational institutions possess the necessary resources to fully integrate GenAI systems (Kamalov et al., 2023). Additionally, as noted by Hannan and Liu (2023), not all students have equal access to AI technology or reliable internet connections that drives the AI systems. Also, access to AI tools may be limited because majority of them are offered on paid basis, which may not be affordable to all student readers. This situation leads to a disparity in access among readers (Venkateswari, 2024). Further, the use of AI in personalised learning may be prone to technical malfunctions and disruptions. Ensuring reliability and smooth integration of technology are essential for an effective personalised learning experience, as technical issues or system failures can significantly disrupt the overall learning process (Kamalov et al., 2023).

## Future Directions

As GenAI technology continues to advance, its applications amongst university students continues to increase, thereby increasingly becoming integral part of their learning process through reading. As the technology advances, it will continue to generate new and unimaginable applications in education (Alam and Hasan, 2024). One of the most promising future prospects of GenAI lies in its ability to enhance students' reading experiences. The integration of AI with virtual reality will provide readers with visually rich educational content (Alam and Hasan, 2024). GenAI has the potential to completely change the way in which students engage with books and several other reading materials. Future developments suggest reduced human interaction, with increased engagement between readers and technology (Preiksaitis and Rose, 2023). Thus, balanced strategy for integrating AI into the educational process is crucial for mitigating the risks associated with potential drawbacks. Furthermore, the future of GenAI in reading, as well as in other teaching and learning processes, focuses on human-AI interactions. The potential of GenAI in aiding readers through various interactive applications, such as virtual assistants, is considerable (Virvou, 2022). To keep abreast of the changes and emerging applications, the future will demand lifelong learning (Jie and Kamrozzaman, 2024). As GenAI transforms continuous education and skills development, lifelong learning will be crucial for building a more adaptable and resilient workforce (Mustafa and Lleshi, 2024).

## Discussion

This study offers a comprehensive summary of research exploring the potential of GenAI in enhancing university students' reading environments, focusing on its prospects, challenges, and future directions, as summarized in Figure 2. The analysis which included publications done within the past five years, organized the findings into prospects, challenges and future directions of GenAI application in developing reading spaces. Regarding prospects and challenges of GenAI in developing the reading culture, the study grouped them into a number of themes that emerged from existing literature, each presented separately. Future directions were explored wholistically.

Concerning prospects of AI in developing the reading culture, studies show that that GenAI is clearly contributing to it in a number of ways. The study explored, for example, the issue of accessibility to reading resources. Reading resources might sometimes be inaccessible in conventional libraries, requiring students to physically search through numerous books or articles, or access books that are not in their preferred language. AI addresses these challenges by providing students with access to learning materials anytime, anywhere. GenAI provides also convenience of reading in which, through it, students can access library resources on their devices in their fingertips, effortlessly. It also allows

readers to customize the way they want the reading to be. For instance, they can adjust the font sizes, line spaces and even background colour of the text they are reading. This makes the reading convenient and thus more attracting. Further, even if a reader is too tired to read, or wants to do something else while reading, GenAI provides a read-aloud function which allows them to continue reading. This implies that with AI, reading is simple and convenient. Through personalized reading resources, GenAI can offer students personalized suggestions tailored to a students' interests and previous search behaviors, thereby aiding them in uncovering new information sources pertinent to their reading preferences. This fosters access to reading materials that would have not been easy with conventional approaches, reducing searching time and creating more time for students to accomplish their readings and other academic undertakings. GenAI, through interactive reading, can act like human reading companions that can accompany them and provide affective supports to help them read actively. Through this the tool provides emotional support to students which make them keep on reading. In such a way, students enjoy reading the customized texts from anywhere and at any time while continuously getting companion and emotional support from the tool to continue reading.
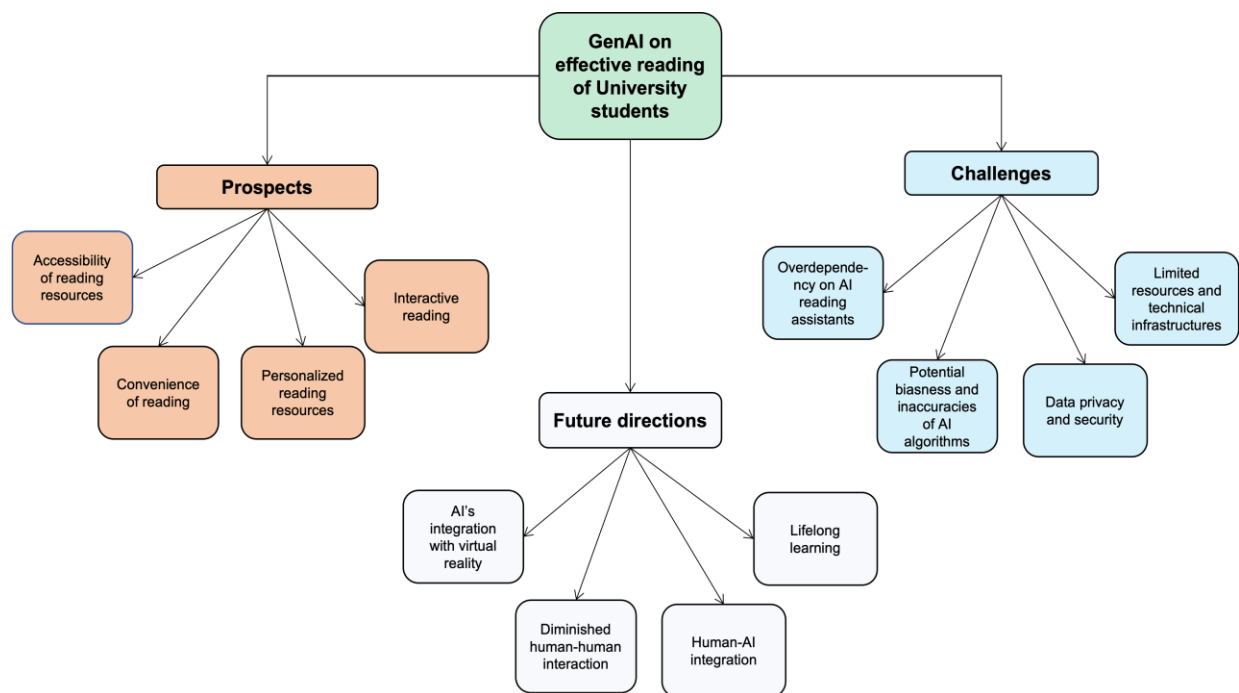


Figure 2. Prospects, Challenges and Future Directions of GenAI in Enhancing University Students' Reading

While artificial intelligence offers significant benefits to readers, there exists concerns regarding its challenges. Continuous use of the tool can potentially create students' overdependence on it. While it true that the tool offers immense advantages, it is equally true also that, for comprehensive learning experiences, conventional reading methods should not be completely abandoned. It is indicated that, in most cases, GenAI provides reading texts in a simplified form, thus overreliance on the tool could result into students who are not critical readers. GenAI systems can lead to breach of data privacy and security which is not only against human dignity but also are likely to affect students reading. When students feel that they are constantly being under surveillance they might not feel free to continue using the AI system, which will eventually affect their reading. In addition, there exists digital divides between institutions and even between students themselves with respect to implementation and use of AI systems. As the system require immense investments in technology, infrastructure, and ongoing professional development, not all educational institutions possess the necessary resources for the same. Similarly, not all students have equal access to AI technology or reliable internet connections that drives the AI systems. This situation may lead to a disparity in access to reading resources among institutions and readers.

The future will bring more advancements in AI applications for reading as in other teaching and learning processes. The advancements will enhance students' reading experiences through applications like virtual reality. The future will bring diminished human to human interaction and engagement (such as readers-librarians' interactions) with a more interaction being between readers and the technology. While this may bring several benefits, it may also be of negative side. Thus, in order to mitigate the drawbacks, it is important that stakeholders are alerted on this and hence institute balanced strategy for integrating AI into the educational process. Additionally, continuous education and skill development for students and all other concerned parties are crucial as part of future directions.

## Conclusion and Recommendations

This study was carried out to establish prospects, challenges and future directions of GenAI applications in developing reading environments for university students. The study found that GenAI has immense potentials of improving reading environments. That can be achieved through improved accessibility of reading resources that AI brings. AI enhances reading convenience by providing students effortless access to customized library resources on their devices. It was established also that AI provides personalized reading resources as well as interactive reading. One challenge identified is that continuous use of AI may lead to student overdependence. In addition, there are potential biasness and inaccuracies of AI algorithms that can lead to a generation of biased reading contents, AI systems can lead to breach of data privacy and security which is not only against human dignity but also are likely to affect students reading. Another challenge is the lack of adequate resources and technical infrastructure. Most of the challenges are, however, manageable. Overall, the benefits of AI in enhancing reading environments outweigh its challenges, provided that appropriate safeguards are implemented. It was, further, found that future directions of AI in developing reading environments involve integration of AI with virtual reality, diminished human-human interaction, human-AI integration, and lifelong learning.

Basing on the study findings and conclusions, the study puts forward a number of recommendations. Universities should consider AI as an opportunity for enhancing students' reading instead of threat. However, strategies should be implemented to prevent overdependence on AI.  To tackle the challenge of data privacy and security, it is important for universities to institute and operationalize students' data governance and protection policies. Further, universities should institute and implement lifelong learning policies for trainers and students.

## References

Aithal, S., & Aithal, P. S. (2023). Effects of AI-based ChatGPT on higher education libraries. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *8*(2), 95-108. http://dx.doi.org/10.2139/ssrn.4453581

Akidi, J.O., Agbese, F.A., & Chukwueke, C. (2021). Influence of the use of the internet on the reading culture of students of government college, Umuahia Abia State, Nigeria. *Library Philosophy and Practice (e-journal).* https://digitalcommons.unl.edu/libphilprac/5013

Akinola, A. A. (2021). Promoting reading culture, the role of stakeholders and ICT for societal development. *IP Indian Journal of Library Science and Information Technology*, 6(1), 4-8. http://doi.org/10.18231/j.ijlsit.2021.002

Alam, M., & Hasan, M. (2024). Applications and Future Prospects of Artificial Intelligence in Education. *International Journal of Humanities & Social Science Studies,*10(1), 197 – 206

Appen (2022). AI is the Key to Convenience. https://www.appen.com/blog/convenience-with-ai-data-powered-applications

Ardito, C. G. (2024). Generative AI detection in higher education assessments. *New Directions for Teaching and Learning,* 1-18. https://doi:10.1002/tl.20624

Baidoo-Anu, D., & Ansah, L.O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI,* 7(1),52-62. https://doi:10.2139/ssrn.4337484

Barrentine, S. J. (1996). Engaging with reading through interactive read-alouds. *The reading teacher*, *50*(1), 36-43.

Barret, A., & Pack, A. (2023). Not quite eye to A.I: student and teacher perspectives on the use of generative artificial intelligence in the writing process. *International Journal of Educational Technology in Higher Education,* 20 (1), 59. https://doi.org/10.1186/s41239-023-00427-0

Batista, J., Mesquita, A., & Carnaz, G. (2024). Generative AI and Higher Education: Trends, Challenges, and Future Directions from a Systematic Literature Review. *Information*, *15*(11), 676. https://doi.org/10.3390/info15110676

Bookt (2023). The Impact of Technology on Reading Habits and the Future of Reading. https://www.linkedin.com/pulse/impact-technology-reading-habits-future-booktofficial/

Bulgurcuoglu, A. N. (2016). Relationship between Critical Thinking Levels and Attitudes towards Reading Habits among Pre-Service Physical Education Teachers. *Educational Research and Reviews*, *11*(8), 708–712. https://doi.org/10.5897/ERR2016.2713

Burriss, S. K., & Leander, K. (2024). Critical posthumanist literacy: Building theory for reading, writing, and living ethically with everyday artificial intelligence. *Reading Research Quarterly*, *59*(4), 560-569.

Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, *20*(1), 43. https://doi.org/10.1186/s41239-023-00411-8

Chen, B., & Zhu, X. (2023). Integrating generative AI in knowledge building. *Computers and Education: Artificial Intelligence*, *5*, 100184.  https://doi.org/10.1016/j.caeai.2023.100184

Chen, S. Y. (2023). Generative AI, learning and new literacies. *Journal of Educational Technology Development & Exchange*, 16(2), 1-19. https://doi.org/10.18785/jetde.1602.01

Chiu, T.K.F. (2024). Feature research recommendations for transforming higher education with generative AI. *Computers and Education: Artificial intelligence, 6*. https://doi.org/10.1o16/j.caeai.2023.100197

CO/AI (2024). How AI Can Enhance Reading Habits in the Digital Age. https://getcoai.com/news/how-ai-can-enhance-reading-habits-in-the-digital-age/

Dai, Y. (2024). Why students use or not use generative AI: Student conceptions, concerns, and implications for engineering education. *Digital Engineering*, 100019. https://doi.org/10.1016/j.dte.2024.100019

Dong, Y., Yu, X., Alharbi, A., & Ahmad, S. (2022). AI-based production and application of English multimode online reading using multi-criteria decision support system. *Soft Computing*, *26*(20), 10927-10937. https://doi.org/10.1007/s00500-022-07209-2

Evmenova, A. S., Borup, J., & Shin, J. K. (2024). Harnessing the Power of Generative AI to Support ALL Learners. *TechTrends*, 1-12. https://doi.org/10.1007/s11528-024-00966-x

Farrelly, T., & Baker, N. (2023). Generative artificial intelligence: Implications and considerations for higher education practice. *Education Sciences*, *13*(11), 1109. https://doi.org/10.3390/educsci13111109

Gan, S., & Loh, C. E. (2024). 'I Feel Like My Awareness Grew': Fostering Dialogues to Increase Awareness Through Virtual Book Clubs. *Changing English*, 31(3), 241–252. https://doi.org/10.1080/1358684X.2024.2358023

García-Peñalvo, F., & Vázquez-Ingelmo, A. (2023). What do we mean by GenAI? A systematic mapping of the evolution, trends, and techniques involved in Generative AI. https://doi.org/10.9781/ijimai.2023.07.006

Giannini, S. (2023). Generative AI and the future of education. UNESCO. https://www.laifitalia.it/

Gruenhagen, J.H., Sinclair, P.M., Carroll, J., Baker, P.R.A., Wilson, A. & Demant, D. (2024). The rapid rise of generative AI and its implications for academic integrity: students' perceptions and use of chatbots for assistance with assessments. *Computer and Education: Artificial Intelligence.* https://doi.org/10.1016/j.caeai.2024.100273

Hamamra, B., Mayaleh, A., & Khlaif, Z. N. (2024). Between tech and text: the use of generative AI in Palestinian universities-a ChatGPT case study. *Cogent Education*, *11*(1), 2380622. https://doi.org/10.1080/2331186X.2024.2380622

Hannan, E., & Liu, S. (2023). AI: new source of competitiveness in higher education. *Competitiveness Review: An International Business Journal*, *33*(2), 265-279.

Hashmi, N., & Bal, A. S. (2024). Generative AI in higher education and beyond. *Business Horizons*. 67, 607-614. https://doi.org/10.1016/j.bushor.2024.05.005

Higgs, J. M., & Stornaiuolo, A. (2024). Being Human in the Age of Generative AI: Young People's Ethical Concerns about Writing and Living with Machines. *Reading Research Quarterly*, 59(4), 632–650. https://doi:10.1002/rrq.552

Huang, L. (2023). Ethics of artificial intelligence in education: Student privacy and data protection. *Science Insights Education Frontiers*, *16*(2), 2577-2587.

Jie, A. L. X., & Kamrozzaman, N. A. (2024). The Challenges of Higher Education Students Face in Using Artificial Intelligence (AI) against Their Learning Experiences. *Open Journal of Social Sciences*, *12*(10), 362-387.

Jochim, J., & Lenz-Kesekamp, V. K. (2024). Teaching and testing in the era of text-generative AI: exploring the needs of students and teachers. *Information and Learning Sciences*. https://doi.org/10.1108/ILS-10-2023-0165

Kim, J., Detrick, R. & Li, N. (2024). Exploring students' perspectives on generative AI-assisted academic writing. *Education and Information Technologies.* 1-36. https://doi.org/10.1007/s10639-024-12878-7

Kulo, S. A., Odundo, P. A., & Kibui, A. (2019). Interactive reading strategies on learner achievement in reading skills in secondary schools in Kisumu County, Kenya. *International Journal of English Language Teaching*, *7*(5), 1-13.

Lennox, S. (2013). Interactive read-alouds—An avenue for enhancing children's language for thinking and understanding: A review of recent research. *Early Childhood Education Journal*, *41*, 381-389.

Liu, C. C., Liao, M. G., Chang, C. H., & Lin, H. M. (2022). An analysis of children'interaction with an AI chatbot and its impact on their interest in reading. *Computers & Education*, *189*, 104576.

Madonsela, S. (2020). Riddles, meanings and cognitive development of the African child in the siSwati tradition. *African Journal of Rhetoric*, *12*(1), 44-64.

Maedche, A., Legner, C., Benlian, A., Berger, B., Gimpel, H., Hess, T., Hinz, O., Morana, S. & Söllner, M. (2019). AI-based digital assistants: Opportunities, threats, and research perspectives. *Business & Information Systems Engineering*, *61*, 535-544.

Magrill, J., & Magrill, B. (2024). Preparing Educators and Students at Higher Education Institutions for an AI-Driven World. *Teaching and Learning Inquiry*, *12*, 1-9. https://doi.org/10.20343/teachlearninqu.16

Massaty, M. H., Fahrurozi, S. K., & Budiyanto, C. W. (2024). The role of AI in fostering computational thinking and self-efficacy in educational settings: A systematic review. *IJIE (Indonesian Journal of Informatics Education)*, *8*(1), 49-61. https://dx.doi.org/10.20961/ijie.v8i1.89596

Matto, G. (2024). Is ChatGPT Building or Destroying Education? Perception of University Students in Tanzania. *Journal of Education and Learning Technology (JELT)*. 5(4), 38-51. https://doi.org/10.38159/jelt.2024541

McDonald, N., Johri, A., Ali, A., & Hingle, A. (2024). Generative artificial intelligence in higher education: Evidence from an analysis of institutional policies and guidelines. *arXiv preprint arXiv:2402.01659*. https://doi.org/10.48550/arXiv.2402.01659

Merga, M. K. (2017). Interactive reading opportunities beyond the early years: What educators need to consider. *Australian Journal of Education*, 61(3), 328-343. https://doi.org/10.1177/0004944117727749

Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and opportunities of generative AI for higher education as explained by ChatGPT. *Education Sciences*, *13*(9), 856. https://doi.org/10.3390/educsci13090856

Mireku, M., Abenaba, D., & Kweku, A. S. (2024). Higher education students' perception on the ethical use of generative AI: a study at the University of Cape Coast. Bachelor's degree Thesis. South Africa, University of Cape Coast.

Mlay, S. V., Sabi, H., Tsuma, C. K., Langmia, K., Mbarika, V. W., & Kituyi, M. (2014). Towards an improved reading habit of university students: The impact of ICT. In *6th Annual international conference on ICT for Africa (ed. Kituyi M), Yaounde, Cameroon* (pp. 2-14).

Mustafa, B., & Lleshi, S. (2024). The impact of lifelong learning and investments in employee development on employee productivity and performance. *Multidisciplinary Reviews*, *7*(8), 2024175-2024175. https://10.31893/multirev.2024175

Mustafa, S.K., Ali, O.S., Awlqadir, M.S., & Mahmood, R.J. (2021). Investigating factors affecting poor reding culture among EFL university students, *Education, Sustainability Society (ESS),* 4(1), 33-38. http://doi.org/10.26480/ess.01.2021.33.38

Mutanga, B. M., Lecheko, M., & Revesai, Z. (2024). Navigating the grey area: students' ethical dilemmas in using AI tools for coding assignments. *IJIE (Indonesian Journal of Informatics Education)*, *8*(1), 15-24. https://doi.org/10.20961/ijie.v8i1.90385

Nikolopoulou, K. (2024). Generative Artificial Intelligence in Higher Education: Exploring ways of harnessing pedagogical Practices with the assistance of ChatGPT. *International Journal of Changes in Education*, *1*(2), 103-111. https://orcid.org/0000-0002-2175-1765

Odunayo, O.T. (2021). Reading culture, intellectual development and the knowledge sector: A case study of selected students of Mount Top University. *UTUENIKANG: Ibom Journal*, (1).

Okolo, S. E., & Ivwighreghweta, O. (2020). Reading Habits Amongst Undergraduate Students: Case Study of Michael and Cecilia Ibru University, (MCIU) Agbarha-Otor. *Reading*. https://digitalcommons.unl.edu/libphilprac/4077

Pattyam, S. P. (2020). AI in Data Science for Predictive Analytics: Techniques for Model Development, Validation, and Deployment. *Journal of Science & Technology*, *1*(1), 511-552.

Preiksaitis, C., & Rose, C. (2023). Opportunities, challenges, and future directions of generative artificial intelligence in medical education: scoping review. *JMIR medical education*, *9*, e48785.

Saúde, S., Barros, J. P., & Almeida, I. (2024). Impacts of Generative Artificial Intelligence in Higher Education: Research Trends and Students' Perceptions. *Social Sciences*, *13*(8), 410. https://doi.org/10.3390/socsci13080410

Sirghi, N., Voicu, M., Noja, G. G., & Gurita, O. S. (2024). Challenges of Artificial Intelligence on the Learning Process in Higher Education. *Amfiteatru Economic,* *26,* 53-70. https://doi.org/10.24818/ea/2024/65/53

Sotiloye, B., & Bodunde, H. (2018). Assessment of students' reading culture in a Nigerian university: waxing or waning? *Legon Journal of Humanities,* 29(2). https://dx.doi.org/10.4314/ljh.v29i2.11

Vaza, R. N., Parmar, A. B., Mishra, P. S., Abdullah, I., & Velu, C. M. (2024). Security And Privacy Concerns In AI-Enabled Iot Educational Frameworks: An In-Depth Analysis. *Educational Administration: Theory and Practice*, *30*(4), 8436-8445.

Venkateswari, S. L. (2024). AI Tools to Foster Reading Habit in College Students. *Language in India*, *24*(5). http://languageinindia.com/may2024/drlathaAItoolscollegestudents.pdf

Virvou, M. (2022, July). The emerging era of human-AI interaction: Keynote address. In *2022 13th International Conference on Information, Intelligence, Systems & Applications (IISA)* (pp. 1-10). IEEE.

Wang'ang'a, A.W. (2024). Consequences of Artificial Intelligence on Teaching and Learning in Higher Education in Kenya: Literature Review. *East African Journal of Education Studies*, *7*(1), 202-215. https://doi.org/10.37284/eajes.7.1.1718

Watkins, M. (2024). Automated Aid or Offloading Close Reading? Student Perspectives on AI Reading Assistants. *Teaching and Generative AI*.

Watkins, M. (2024). No One is Talking About AI's Impact on Reading. https://marcwatkins.substack.com/p/no-one-is-talking-about-ais-impact.

Wema, E. (2018). Investigating reading culture among students in higher learning institutions in Tanzania, *University of Dar es Salaam Library Journal,* 13(1),4-19.

Woolman, D. C. (2001). Educational reconstruction and post-colonial curriculum development: A comparative study of four African countries. *International education journal*, *2*(5), 27-46.

Xiao, H. (2023, September). The Impact and Challenge of ChatGPT on Library Work. In *2023 9th International Conference on Humanities and Social Science Research (ICHSSR 2023)* (pp. 997-1003). Atlantis Press.

Xu, Y., Wang, D., Collins, P., Lee, H., & Warschauer, M. (2021). Same benefits, different communication patterns: Comparing Children's reading with a conversational agent vs. a human partner. *Computers & Education*, *161*, 104059.

Young, J. C., & Shishido, M. (2023, July). Evaluation of the Potential Usage of ChatGPT for Providing Easier Reading Materials for ESL Students. In *EdMedia+ Innovate Learning* (pp. 155-162). Association for the Advancement of Computing in Education (AACE).

Yusof, D.A.A. (2021). Reading habit among students in the digital era: changes of trends and behaviours. *Journal of Academic Library Management* (AcLiM), 1(1). https://doi.org/10.24191/aclim.vlil.5

Yusuf, A., Pervin, N., & Román-González, M. (2024). Generative AI and the future of higher education: a threat to academic integrity or reformation? Evidence from multicultural perspectives. *International Journal of Educational Technology in Higher Education*, *21*(1), 21. https://doi.org/10.1186/s41239-024-00453-6

Zargaran, A., Turki, M. A., Bhaskar, J., Spiers, H. V. M., & Zargaran, D. (2020). The role of technology in anatomy teaching: striking the right balance. *Advances in medical education and practice*, 259-266.

Zhou, Y. (2024). An Exploratory Study on the Impact of Generative AI on Student Learning in Higher Education. Master's thesis, University of Washington. https://hdl.handle.net/1773/51933