

Preparing to Revolutionize Education with the Multi-Model GenAI Tool Google Gemini? A Journey towards Effective Policy Making

Pethigamage Perera^{1*}, Madhushan Lankathilake²

¹Lecturer – ICT, College of Information and Communications Technology, Central Queensland University, Australia

²Assistant Librarian, Faculty of Science, University of Colombo, Sri Lanka

DOI: [10.36348/jaep.2023.v07i08.001](https://doi.org/10.36348/jaep.2023.v07i08.001)

| Received: 25.06.2023 | Accepted: 03.08.2023 | Published: 09.08.2023

*Corresponding author: Dr. Pethigamage Perera

Lecturer – ICT, College of Information and Communications Technology, Central Queensland University, Australia

Abstract

The integration of Generative AI (GenAI) in Education presents immense potential for reshaping learning experiences and empowering students and educators. However, harnessing this potential requires collective action and responsible decision-making to ensure the effective and ethical use of AI technologies. This paper presents a series of recommendations and proposals aimed at effectively integrating GenAI in the higher education sector, catering to the perspectives of government, AI developers, students, educators, universities, schools, and researchers. By exploring diverse viewpoints about ChatGPT and future Google Gemini, this research aims to create a comprehensive recommendation guiding regulatory measures that address challenges, ethical considerations, and best practices of GenAI integration. Through a holistic approach, researchers believe that policymakers can foster a transformative and ethical environment, leveraging the full potential of generative AI while safeguarding students' well-being and academic integrity.

Keywords: AI Guidelines, AI Policymakers, regulating GenAI, GenAI in Government, AI Policy, Google Gemini, Google DeepMind, AI Recommendations, Chat GPT.

Copyright © 2023 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

1.0 INTRODUCTION

Google Gemini, the highly anticipated multimodal Gen AI tool, is on the verge of release. Educators are optimistic that this cutting-edge tool will herald a new era in Education, surpassing its counterpart ChatGPT and revolutionizing the learning experience. When comparing GPT-3 and Gemini AI, the most significant differentiating factor is the training data used in their development. GPT-3, developed by OpenAI, has been trained on a vast dataset of diverse text sources, enabling it to generate human-like responses and perform a wide range of language-related tasks. On the other hand, Gemini AI, created by Google DeepMind, leverages the power of multi-model GenAI technology. This approach involves training the AI on not only text data but also on various other data types, such as images, audio, and more, allowing it to excel in tasks that demand cross-modal understanding and integration.

Both GPT-3 and Gemini AI have shown impressive capabilities in their respective domains, with GPT-3 being celebrated for its language prowess and Gemini AI for its versatility across different data modalities. As AI technology continues to advance,

understanding the nuances of various models' training data becomes vital for making informed decisions about their applications.

One of the key advancements in both Google and Open AI technology is Generative AI (GenAI), which enables the creation of new content such as text, images, and videos that closely mimic human-produced outputs. It has emerged as a transformative force, revolutionizing various industries and aspects of daily life. In the realm of Education, AI holds immense promise to reshape learning experiences and empower students and educators.

The unleashed potential of Generative AI demands collective action to harness its full impact in Education. This calls for defining responsible and appropriate AI applications while understanding their implications. Educational institutions and teachers urgently require government support to allocate resources for informed guidance and concrete examples, facilitating seamless integration of AI tools into classrooms. Alongside, safeguarding students' digital identities becomes paramount. As the genie of Generative AI is released from the bottle, it becomes

imperative to navigate its potential with responsible and informed action. Therefore, striking a balance between universal applicability and subject-specific needs is crucial in resource development.

The integration of GenAI in the education sector presents both opportunities and challenges, calling for collective efforts from policymakers, educational institutions, teachers, AI developers, and researchers. This convergence of perspectives forms the basis for a comprehensive policy that dedicated to regulating Generative AI in Education.

The authors of this paper had previously identified the benefits as well as issues and limitations of using GenAI technologies by examine the existing research. They (Perera, P. I., and Lankathilake, M., 2023) provided a set of guidelines for students and teachers to consider on the effective use of Gen AI. However, the authors in this article have emphasised the importance of developing policies and guidelines to make sure the ethical use of GenAI technologies in Education not only for students and teachers, but also in all the aspects such as government, schools, higher education Institutes, and AI developers and researchers.

In this research, Researchers explore a series of recommendations and proposals aimed at maximizing the positive impact of GenAI while mitigating potential risks. Through a balanced approach, we aim to define responsible applications of AI, establish clear guidelines, and prioritize ethical considerations. The goal is to ensure that GenAI becomes a powerful tool to enhance learning outcomes, foster creativity, and prepare students for the complexities of a technology-driven world.

With the support of government, educational institutions, and the collective expertise of educators and researchers, we delve into critical areas of AI integration. From shaping curriculum development to safeguarding students' digital identities, this research addresses key challenges and offers practical recommendations.

This research aims to explore the perspectives of various stakeholders, including AI companies, students, educators, institutes, schools, and researchers, regarding the responsible integration of GenAI in Education. The research seeks to identify and analyze the recommendations and advice provided by these different viewpoints to create a comprehensive policy. By understanding the diverse viewpoints, the study intends to propose effective regulatory measures that address the challenges, ethical considerations, and best practices of GenAI integration in educational settings.

The research question ultimately seeks to guide policymakers in fostering a transformative and ethical environment that maximizes the potential of GenAI while safeguarding students' well-being and academic integrity.

Research Question: How can the integration of multi-model Generative AI (GenAI) in education be effectively regulated to ensure responsible and equitable use from the viewpoints of government, AI companies, students, educators, institutes, schools, and researchers?

The aim of this research is to unlock the transformative potential of Generative AI in Education. Together, we can build a future where AI technologies enrich the learning experience, foster critical thinking, and create an inclusive and equitable educational landscape for all.

2.0 LITERATURE REVIEW

There are many Artificial AI tools and many more to release in near future, such as Google Gemini. The main product in the current market is Chat GPT. GenAI, a variant of GPT-3 developed by OpenAI, has gained significant attention and popularity since its release. It has been widely used, including in educational settings such as the International Baccalaureate program (Chadwick, 2023). While there have been concerns and attempts to ban Generative AI in Education, previous attempts to ban emerging technologies in higher Education have not been successful (Finkle & Masters, 2014; Spies *et al.*, 2010).

In recent years, there has been growing interest in using chatbots and artificial intelligence (AI) in Education and research. Generative AI, based on the GPT-3 architecture, shows promise in enhancing teaching and learning experiences. Generative AI has been used to create various literary texts, explain complex topics, and generate model answers (Tili *et al.*, 2023). Integrating chatbots into online platforms can improve student-teacher interaction and learning experiences (Dwivedi *et al.*, 2023; Kuhail *et al.*, 2022). However, over-reliance on chatbots may decrease critical thinking skills and independent problem-solving abilities (Kooli, 2003). Generative AI benefits non-English speaking students in language editing, translation, and overcoming language barriers (Lim *et al.*, 2023). It provides accurate responses, enhances peer communication, and offers quick information summarization (Geerling *et al.*, 2023; Farrokhnia *et al.*, 2023). Generative AI's interactive nature helps identify gaps in student learning and provides timely feedback (Lim *et al.*, 2023). While Generative AI has the potential to revolutionize education and research, caution is needed to maintain critical thinking skills and independent problem-solving abilities.

Technology's increasing presence in Education raises concerns about the potential negative impact on critical thinking skills and independent problem-solving abilities. Overreliance on technology can hinder creative and critical thinking, leading to disengagement and a lack of initiative (Kooli, 2003). Generative AI, while efficient, relies on prompts and lacks contextual

understanding and creativity (Kooli, 2023). Plagiarism detection and equitable assessment are challenges posed by AI tools (Geerling *et al.*, 2023). There is a need for vigilance to ensure accuracy and integrity (Farrokhnia *et al.*, 2023; Debby *et al.*, 2023). Educators must strike a balance between technology and traditional teaching methods to foster well-rounded skills. AI-generated text can evade detection but must be prevented to maintain academic integrity (Yeadon *et al.*, 2022). Affordability and access to Generative AI tools pose equity concerns (Lim *et al.*, 2023). Considerations should be made before implementing premium versions.

3.0 METHODOLOGY

This study was conducted with the objective of investigating the opinions and suggestions of selected Sri Lankans on using AI tools in Education. Researchers employed a qualitative research approach, utilizing an instrumental case study research design utilizing interviews and thematic analysis to explore the integration of Generative AI (GenAI) in education. In an instrumental case study, the researcher selects one issue or concern and selects one boundary case to examine the issue (Creswell, 2007). Case study research investigates a selected one or set of cases in depth by focusing on numerous details within each case and the context (Djamba & Neuman, 2002). In the present study, the selected case is the use of GenAI in Education. Participants selected through purposive sampling, including government representatives, educational leaders, teachers, AI developers, and researchers, will engage in in-depth, semi-structured interviews. Interviews are a popular data collection technique as it is a method where the researcher can obtain a high response rate and researcher could clarify the responses at the time of data collection. In semi-structured interviews, the researcher must prepare an interview guide. This will

help the researcher to maintain the focus of the interview on a particular topic and the same time, give some freedom to the participant to express their views (Wenzel & Babbie, 1994).

Researchers developed the interview guide after examining the literature thoroughly. The interview guide was pilot tested using a few colleagues of the researcher. Pilot testing helps to find out any duplications, test the appropriateness of the research instrument and reduce the risk of failure of the research (van Teijlingen, E. R. and Hundley V., 2001). The interview guide included questions on general perspectives of AI, how they think the AI should be used in Education, the governments' role and benefits and threats, and their recommendations.

The interview questions will focus on eliciting insights about the benefits, challenges, ethical considerations, and best practices related to GenAI in educational contexts. Ethical guidelines will be followed, ensuring informed consent, confidentiality, and anonymity for all participants. Thematic analysis will be used to analyze the interview data systematically, involving data transcription, coding, theme identification, development, and interpretation. Thematic analysis is a process of identifying common patterns or themes within qualitative data in order to address the research problem or issues (Maguire, M and Delahunt, 2014). Qualitative data management software Nvivo 10 was used to manage the data collected.

The interviewees were selected through researcher's social networks. Accordingly, 38 individuals representing diverse cultures, different educational backgrounds, and different working backgrounds were selected. The background of the participants is presented in Table 1.

Table 1: Summary of the demographic information of the participants

Factor		Frequency	Percentage
Age	25-34	9	24
	35-44	23	61
	>45	5	13
Gender	Male	33	87
	Female	5	13
Highest Educational Qualification	G.C.E. A/L	6	16
	Degree	17	45
	Masters	10	26
	Professional Qualifications	2	5
	PhD	3	8
Profession	University students	5	13
	School Teachers	5	13
	University Academics/ Researchers	7	18
	Software developers	5	13
	Government Officers	6	16
	Cooperate sector top managers	9	24

All the interviews were recorded and transcribed verbatim. The transcripts were coded by the researchers using pre-determined codes. The researcher creates the codes before analysing the interview transcripts.

4.0 RESULT AND DISCUSSION

As the use of Generative AI (GenAI) continues to advance, its potential to transform Education is undeniable. Recognizing the significance of this technology in shaping the future of learning. These guidelines emphasize the need to address the diverse multimodal capabilities of GenAI, which extend beyond text to include audio, images, and video generation.

In tandem with technological advancements, educators must be equipped with the knowledge of AI risks and opportunities through a nationally consistent approach. To ensure equitable access to AI resources and technology, regulatory efforts must focus on mitigating educational inequalities. These guidelines aim to foster educational innovation, promote responsible GenAI use, and enhance student learning while upholding data privacy and environmental sustainability.

4.1 Guidelines for Generative AI in Education – Government perspective.

1. Addressing the Multimodal Nature of Generative AI

The government policy needs to address the full multimodal nature of generative AI, as these tools can generate not only text but also audio, images, and video.

2. Educating Educators about AI Risks and Opportunities

Teachers, school leaders, and principals should be educated about the risks and opportunities presented by AI through a nationally consistent approach.

3. Mitigating Educational Inequalities through Regulation

Advocates for regulatory efforts to mitigate potential exacerbation of educational inequalities arising from disparities in access to technology or AI resources.

4. Government Leadership and Guidance

The country's international reputation for educational innovation and leadership necessitates government leadership or guidance.

5. Clear Guidelines for AI Technology Use

Clear guidelines are needed on how these technologies can be used – for example, setting age limits on access.

6. Learning from International Practices and Collaboration

Liaising with the European Union (EU) is important to learn from international practices, particularly through the UNESCO International Institute for Higher Education in Latin America. The EU has been the first to attempt serious regulation of

artificial intelligence and provide guidance in Education through the EU council.

7. Addressing the Lack of Educational Guidelines

The lack of guidelines and leadership from educational bodies around supporting the challenges of GenAI use in the classroom needs to be addressed.

8. Encouraging Accessibility and Equitable Use

Regulators can encourage developers and providers to support accessibility and equitable use by considering appropriate educational use cases and affordable licensing options.

9. A Future-Focused Approach to AI Technologies

A future-focused, holistic approach should be taken to consider the complexities of these new and emerging technologies. Encouraging open discussions and opportunities for debate is essential.

10. Facilitating Cross-Sector Engagement

Facilitate cross-sector engagement and host sector-wide working groups to discuss and prepare best practice guidelines for responsible use and incorporation of GenAI into existing policies and practices.

11. Enhancing Student Learning through AI

Regulatory efforts should focus on the potential of generative AI tools to enhance student learning through increased accessibility and differentiation while avoiding disadvantage to students in an increasingly globalized workforce.

12. Privacy and Data Protection Measures

Privacy and data protection measures must ensure a clear understanding of how data is used to improve AI and where data is stored.

13. Learning from International and Domestic Practices

Examine international and domestic practices and policies in response to the increased use of generative AI tools in Education, including examples of best practice implementation, independent evaluation of outcomes, and lessons applicable to the educational context.

14. Consistency in Government Response

Recommend that the government's response be consistent with other educational issues, such as academic integrity and cybersecurity, by setting a threshold and allowing institutions to respond in a way that best supports their own operations and communities.

15. Environmental sustainability

Many generative AI systems are power- and resource-hungry. Their use needs to be balanced with the environmental costs. Their use should not displace existing and future commitments to sustainability.

4.2 Guidelines for Generative AI in Education – Teacher's Perspective

These guidelines provide practical recommendations for educators aiming to incorporate Generative AI into their educational practices while

maintaining academic integrity and supporting students' learning and development. By embracing these guidelines, educators can harness the potential of AI as an educational resource and prepare students for an AI-driven future.

1. **Ethical Considerations and Limitations:**

Address ethical issues and limitations when incorporating Generative AI into school use, enabling educators to harness AI as a valuable educational resource.

2. **Advancing Students' Knowledge of AI Technologies:**

Explore and harness ways to help students advance their knowledge of AI technologies, preparing them for the digital future.

3. **Alternative Approaches to Assessment:**

Develop alternative approaches to assessment, incorporating a combination of process assessment, closer working relationships with students, and more complex assessments to adapt to Generative AI use. Exercise caution when using GenAI for marking or feedback.

4. **Students as Partners Approach:**

Adopt the Students as Partners approach, where student representatives collaboratively co-design learning, teaching approaches, and assessments with academics.

5. **Empowering Individual Teachers:**

Empower individual teachers to make AI a focus in their teaching and take responsibility for integrating AI into their instructional practices.

6. **Formative Assessment Practices:**

Encourage formative assessment practices, such as self-assessment and peer feedback, to foster students' active engagement and learning with Generative AI tools.

7. **Preventing Plagiarism:**

Implement strategies to prevent plagiarism when using Generative AI, ensuring academic integrity is maintained.

8. **Providing Personalized Feedback:**

Provide personalized feedback to students to enhance their learning experiences and support their individual needs.

9. **Promoting Originality and Creativity:**

Promote originality and creativity in assignments, encouraging students to leverage Generative AI tools to generate innovative and unique content.

10. **Combining AI with In-Person Assessments:**

Incorporate proctored, in-person assessments alongside AI tools to strike a balance between leveraging technology and maintaining academic integrity.

11. **Raising Awareness of GenAI's Uses and Limitations:**

Raise awareness among students about Generative AI's potential uses and limitations to help them

navigate uncertainty and encourage responsible academic conduct.

12. **Clarity on Responsible Use:**

Provide clarity around the responsible use of GenAI in assessment, guiding students on how to ethically engage with AI tools and content generation.

4.3 Guidelines for GenAI in Education – AI developers' Perspective.

By adopting these responsible practices for the integration of generative AI tools in Education, institutions can harness the potential of AI while maintaining ethical standards, promoting student-centric learning experiences, and preparing graduates for the future of work.

1. **Student Data Privacy Protection:**

Regulatory initiatives should require developers and providers of generative AI tools in Education to prioritize student data privacy. Measures must be implemented to safeguard sensitive information from unauthorized access or misuse.

2. **Addressing Algorithmic Bias:**

Efforts should be made to address algorithmic bias in generative AI tools to ensure fair and equitable outcomes for all users, regardless of their background or characteristics.

3. **Transparent AI-Driven Decision-Making:**

Regulations should mandate transparency in AI-driven decision-making processes. This includes providing information about data sources, potential limitations, and how AI models arrive at specific conclusions.

4. **Upholding Academic and Research Integrity:**

Regulatory initiatives must uphold the highest standards of academic and research integrity. This is crucial to safeguard against the possible dissemination of misleading information facilitated by AI-generated content.

5. **Feasibility of Watermarks for Content Verification:**

To ensure the integrity of content generated by Generative AI technologies, regulatory initiatives may require the injection of watermarks into their output. Watermarks are detectable patterns that can assist in identifying AI-generated content.

6. **Managing Unregulated GenAI Technologies:**

Address the challenge of unregulated Generative AI technologies that could allow students to bypass content verification mechanisms, potentially compromising academic integrity.

7. **Watermark Injection and Detection:**

Regulations should specify guidelines for watermark injection to make detection more effective. Watermarks can be intentionally made detectable to AI detection systems, enhancing content verification.

4.4 Guidelines for GenAI in Higher Ed. – Higher Educational institutes perspective.

By adopting these responsible practices for the integration of generative AI tools in Education, institutions can harness the potential of AI while maintaining ethical standards, promoting student-centric learning experiences, and preparing graduates for the future of work. These recommendations emphasize the importance of continuous learning, data control, and responsible use to foster a positive impact on Education and student development.

1. **Controlled Integration of Generative AI Tools:**
Instead of temporary bans, educational institutions should adopt a controlled approach to integrating generative AI tools. Implement partnerships with established platforms, such as Microsoft's 'Open AI,' to produce versions of chatbots tailored to educational needs.
2. **Promoting Holistic Learning:**
Encourage a focus on the holistic nature of learning while leveraging generative AI tools. Emphasize personalized and authentic learning experiences and assessments that align with students' individual needs and capabilities.
3. **Fostering Workplace Readiness:**
Ensure that the learning process equips students with both depth and breadth of knowledge, skills, and tools, preparing them for workplace readiness and future adaptability.
4. **Continuous Professional Development:**
Prioritize ongoing professional development opportunities for both students and staff. These programs should focus on building new digital literacy skills to stay up-to-date with emerging technologies.
5. **Ethical Principles and Guidelines:**
Develop and implement ethical principles and guidelines for the use of generative AI tools in higher education. These frameworks should emphasize safe, ethical, and responsible practices in AI integration.
6. **Enhanced Data Control:**
Leverage private cloud solutions like Microsoft Azure Tenancy to maintain greater control over data accessed through generative AI platforms. This enhances data security and reduces the risk of inappropriate content.
7. **Ensuring Appropriate Use Cases:**
Adopt a responsible use approach when incorporating generative AI. Evaluate use cases to ensure they align with educational goals and avoid potential misuse or inappropriate content generation.
8. **Emphasizing Student-Centric Learning:**
Put students at the center of AI integration efforts. Tailor generative AI tools to support their learning needs, foster critical thinking, and encourage creative and responsible use.

9. **Collaboration and Alignment:**

Promote collaboration among professional accreditation bodies, industry partners, and universities to align positions on AI integration, ensuring responsive and coherent courses.

10. **Addressing Privacy Concerns:**

Prioritize privacy protection and data security in AI applications. Implement measures to prevent sensitive information or personally identifiable data from being input into AI tools.

11. **Engaging in Ethical Debate**

Encourage universities to take an active role in leading public debates about the ethics of AI. Graduates should be equipped to be ethical leaders in AI development and adoption.

4.5 Guidelines for GenAI Tools in Education - School perspectives.

These recommendations emphasize the importance of government involvement, clear school policies, and ethical considerations for responsible AI integration in Education. By adopting these guidelines, schools can navigate the complexities of AI implementation while upholding academic integrity and providing meaningful AI experiences to students.

1. **Government Involvement and Efficient Implementation:**

Government intervention is essential to avoid inefficiencies in AI integration in schools. Involvement in areas such as assessment, academic integrity, and detection is crucial for a standardized and effective approach.

2. **School Policy Development:**

Schools lacking GenAI policies must develop comprehensive ones tailored to their context. Address ethical considerations, responsible use, and guidelines for incorporating AI into the learning process.

3. **Update Plagiarism Policies:**

Existing plagiarism policies should be updated to encompass the use of Generative AI. Clarify how AI-generated content fits into the definition of plagiarism and upholds academic integrity.

4. **Curriculum Inclusion of AI:**

Include AI in the curriculum to provide students with appropriate exposure to AI technologies and their applications across various subjects.

5. **Tailoring Curriculum Integration:**

The integration of Gen AI can vary based on the curriculum and subjects. For example, when teaching subjects such as English, History or Computer Science etc. different approaches are needed.

6. **Principals' Involvement in Guideline Design:**

Involve principals in designing national guidelines, policies, and protocols related to AI integration in schools for practical and successful implementation.

7. **Appropriate Timeframes, Resourcing, and Training:**

Ensure AI implementation in schools is accompanied by realistic timeframes, sufficient resourcing, and comprehensive training for

educators and staff.

8. **Comprehensive School Policy Guidelines:** Establish consistent school policy guidelines covering AI usage, internal use policies, and educational/professional development plans.
9. **Consideration of Institutional Governance:** Institutional governance and policy positions should account for AI use context, assign responsibility for errors, and explore alternative definitions or categorizations of attributes.

4.6 Guidelines for GenAI Tools in Education – Researchers' Perspective

By adhering to these recommendations, educational institutions and researchers can foster responsible AI integration, upholding academic integrity while providing meaningful AI experiences to students and enhancing research capabilities. Government involvement, clear school policies, and ethical considerations play pivotal roles in ensuring efficient, equitable, and ethical incorporation of Generative AI tools in Education and research.

1. **Transparency and Specialist Tools:** Researchers should be aware that the training data sets and methods underlying some generative AI tools, like ChatGPT, are unknown, limiting their appropriate use in research. Specialist tools, such as Consensus, offer more transparency and may be more suitable for specific research needs.
2. **Careful Uploading of Information:** Researchers must exercise caution when uploading information into commercial generative AI tools. Individuals and their employers may lose control over the information uploaded, emphasizing the need for data privacy and security measures.
3. **Types of Data to Avoid Inputting:** Researchers should avoid inputting third-party copyrighted materials, confidential or sensitive data, human research data, and private or personal information into generative AI tools.
4. **Complementary Tool Only:** Generative AI should be used as a complementary tool in research, supporting human researchers rather than replacing/substitute them.
5. **Ethical and Legal Obligations:** Researchers must adhere to important ethical and legal obligations when interacting with generative AI tools, including preparing grant proposals, fellowships, project proposals, and publications.
6. **Addressing Biases in GenAI Models:** Researchers should be aware that commercial generative models can perpetuate biases present in their design and training data. It is incumbent upon researchers to consciously identify, interrogate, and mitigate biases, considering the accuracy, relevance, and veracity of the AI system's outputs.
7. **Limited Use for Research Students:** Research students can be restricted to using generative AI for copyediting and proofreading purposes only.

8. Use Gen AI tools only recommended:

The institutions can aim to establish a list of generative AI tools (both external and internal) and specific guidelines for using particular products.

4.7 Guidelines for GenAI in Education - Students Perspective

1. **Protecting Young Students' Mental Health and Sensitive Information:** Develop appropriate interventions to safeguard young people's mental health and sensitive information when using Generative AI tools. Ensure that AI interactions are designed to be safe and respectful of students' well-being.
2. **Developing Critical Literacies for Students:** Encourage students to use AI-generated texts as a starting point to develop critical literacies. Help them validate claims/facts, identify plagiarism, recognize silences, and assess skewed arguments in AI-generated content.
3. **Consideration of Plagiarism, Factual Errors, and Credibility:** Emphasize the importance of considering potential issues of plagiarism, factual errors, and credibility of sources when using Generative AI tools. Promote critical evaluation of AI-generated outputs.
4. **Educating Educators for Critical Digital/Data Literacy:** Educate educators about Generative AI tools, including how they work, legal and ethical issues, and the underlying business models. Enhancing educators' critical digital and data literacy will enable responsible AI integration in Education.
5. **Interdisciplinary and Cross-Sector Learning:** Support interdisciplinary and cross-sector learning to promote ethical engagement with Generative AI. This includes targeted professional learning or micro-credentials in the short term and addressing concerns raised by the jobs-ready graduates.
6. **Promoting Critical and Ethical Thinking:** Equip learners with the skills to think critically and ethically about when and how to use Generative AI tools effectively in learning, teaching, and assessment.

5.0 CONCLUSION

The emergence of Generative AI (GenAI) as a transformative force in Education demands collective action and responsible implementation to harness its full impact. This Journal article presents a series of recommendations and proposals aimed at effectively integrating GenAI in educational contexts. By defining responsible and appropriate AI applications, understanding their implications, and promoting ethical considerations, the educational landscape can be enriched, and students can be better prepared for the digital future.

The integration of GenAI in Education necessitates government support to allocate resources for informed guidance and concrete examples, facilitating seamless integration of AI tools into classrooms. The focus on safeguarding students' digital identities is paramount, requiring a balance between universal applicability and subject-specific needs in resource development. Holistic learning practices extend beyond safeguarding outcomes; they delve into optimizing the learning process itself, ensuring educational achievements are enhanced for all students.

The guidelines presented in this article cater to various stakeholders and aspects of Education, promoting responsible AI integration. For government entities, it advocates addressing multimodal GenAI aspects, educating educators about AI risks and opportunities, and supporting initiatives for equitable AI use. Educational institutions and educators benefit from recommendations on AI technology use, curricular inclusion of AI, and adopting the Students as Partners approach. For researchers, the handbook highlights the importance of addressing ethical considerations and algorithmic bias while upholding academic and research integrity.

This article provides comprehensive and valuable insights into the responsible and equitable integration of Generative AI. With thoughtful collaboration, ethical considerations, and forward-thinking policies, we can unlock the transformative potential of GenAI, fostering a future where AI technologies enrich the learning experience, prepare students for the complexities of a technology-driven world, and create an inclusive and equitable educational landscape for all. By following these guidelines, policymakers, educators, and researchers can collectively shape a future where AI is a powerful tool, enhancing learning outcomes, fostering creativity, and empowering students to thrive in the digital age.

REFERENCES

- Creswell, J. W. (2007). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Sage Publications Ltd.
- Djamba, Y. K., & Neuman, W. L. (2002). Social Research Methods: Qualitative and Quantitative Approaches. In *Teaching Sociology* (Vol. 30, Issue 3). <https://doi.org/10.2307/3211488>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642.
- Edwin R. van Teijlingen., & Vanora Hundley. (2001). The importance of pilot studies. *Social Research Update*, 35,1–4. <https://doi.org/10.23919/ACC.2018.8431524>
- Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2023). A SWOT analysis of Generative AI: Implications for educational practice and research. *Innovations in Education and Teaching International, ahead-of-print(ahead-of-print)*, 1–15. <https://doi.org/10.1080/14703297.2023.2195846>
- Finkle, T. A., & Masters, E. (2014). Do MOOCs pose a threat to higher Education? *Research in Higher Education Journal*, 26, 1–10.
- Geerling, W., Mateer, G. D., Wooten, J., & Damodaran, N. (2023). Generative AI has Aced the Test of Understanding in College Economics: Now What? *The American Economist* (New York, N.Y. 1960). <https://doi.org/10.1177/05694345231169654>
- Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., & Pechenkina, E. (2023). Generative AI and the future of Education: Ragnarök or reformation? A paradoxical perspective from management educators. *The International Journal of Management Education*, 21(2). <https://doi.org/10.1016/j.ijme.2023.100790>
- Maguire, M., & Delahunt, B. (2014). Doing a Thematic Analysis: A Practical, Step-by-Step Guide for Learning and Teaching Scholars. *All Island Journal on Teaching and Learning Teaching and Learning*, 50(5), 3135–3140. <https://doi.org/10.1109/TIA.2014.2306979>
- Noroozi, O., Biemans, H., & Mulder, M. (2016). Relations between scripted online peer feedback processes and quality of written argumentative essay. *The Internet and Higher Education*, 31, 20–31. <https://doi.org/10.1016/j.iheduc.2016.05.002>
- Perera, P., & Lankathilaka, M. (2023). AI in Higher Education: A Literature Review of ChatGPT and Guidelines for Responsible Implementation. *International Journal of Research and Innovation in Social Science*, VII(VI), 306–314. <https://doi.org/10.47772/ijriss.2023.7623>
- Spies, A. R., Kjos, A. L., Miesner, A., Chesnut, R., Fink, J. L., D'antonio, N., & Russo-Alvarez, G. (2010). Use of laptops and other technology in the classroom. *American Journal of Pharmaceutical Education*, 74(8), 152. <https://doi.org/10.5688/aj7408152>
- Yeadon, W., Oto-Obong Inyang, Mizouri, A., Peach, A., & Testrow, C. (2023). The Death of the Short-Form Physics Essay in the Coming AI Revolution. *arXiv.org*. <https://doi.org/10.1088/1361-6552/acc5cf>