



Glenlead
Centre

Generative AI and Education

Written Evidence to the Department of Education

Dr Steven Watson, Dr Vaughan Connolly, and Jonathan Romic

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Executive Summary

This report sets out the experiences our researchers have had with generative AI and Large Language Models (LLMs), notably ChatGPT, in education. Our researchers have used or seen generative AI tools used for research, writing, teaching, and learning. Their contributions reflect on the benefits and risks they see using generative AI tools in secondary schools and universities.

One of the main benefits of generative AI in education is inclusion. These tools can be particularly useful for students with neurodivergent, cultural, or linguistic characteristics in overcoming educational barriers. They can assist with the development of logical analysis and conceptual understanding. Generative AI can also assist with administrative tasks and decision-making, such as scheduling.

However, while recognising their potential, our researchers are also cautious about the adoption of generative AI tools. Generative AI tools cannot replace all forms of teaching and learning. The sum of education is broader and should not be reduced to procedural and factual fluency alone. Education requires human interaction as well as interaction with machines.

Generative AI also provokes thoughts on concerns and risks. A main concern is that educators are not trained to use these technologies. There are also worries about the bias, veracity, accuracy, and authenticity of their outputs. There is further a risk that students become reliant on generative AI tools to the detriment of their own cognitive and reasoning skills.

There may be areas where generative AI should not be used, such as in the writing of essays, applications, and personal statements.

There are complicated privacy and intellectual property issues associated with the use of generative AI in the context of

education. There is also an issue regarding access and equity of learning opportunities.

Students will use generative AI no matter what, and schools and universities will need to keep ahead of the curve. Educational institutions must learn and control its use within specific boundaries. This requires developing specific guardrails for the ethical and equitable use of generative AI in a manner that ensures academic integrity and equality in opportunity.

There is an urgent need for a strategic body that can provide support and training for educators and help facilitate and support the integration of AI into education. Training and guidelines for use are needed.

The UK Government should take a strategic approach and not rely entirely on entrepreneurial initiatives from the educational technology sector to develop solutions. In a nationally differentiated global system of education, it will be the jurisdictions that adopt a practice-oriented strategic approach that will have an advantage.

Preamble

In June 2023, the Department for Education asked for views and experiences from educators, academics, and other relevant stakeholders on the use of generative AI tools in education in England.

The call for submission was structured in five sections: (1) experience with generative AI, (2) opportunities and benefits, (3) concerns and risks, (4) ethical and legal concerns, and (5) future predications and enabling use.

This is the Glenlead Centre's answer to the 12 specific questions asked by the Department:

1. Have your institutions used AI tools in an education setting?
2. If so, could you briefly describe the ways it was used, and the specific tools used. What were the main challenges you faced and how did you address these?
3. What was the result of your use of these tools, including any impacts?
4. How do you think generative AI could be used to improve education?
5. What subjects or areas of education do you believe could benefit most from generative AI tools?
6. What are your main concerns about using generative AI in educational settings?
7. If at all, have these concerns impacted your use of generative AI? Please explain how.
8. Are there specific subject or areas of education where you believe generative AI should not be used? Why?
9. If any, what are your view regarding ethics, data privacy and security when using generative AI in education?
10. How do you see the role of generative AI in education evolving in the future?
11. What support do education staff, pupils, parent, or other stakeholders need to be able to benefit from this technology?
12. Is there anything else you would like to add to the topic of generative AI in education?

Experience with generative AI

Have your institutions used AI tools in an education setting?

SW: Yes, extensively investigated its use in the integration of Large Language Models (LLMs), such as ChatGPT in research (in the context of reading assistance, literature review, data analysis and as a writing assistant – primarily in qualitative educational and sociological research), teaching and level (helping developing materials, designing teaching, formative feedback and assessment and to support inclusion, i.e., neurodiversity and English as additional language).

VC: Yes. In a secondary school setting, both as a teaching tool in class, and with colleagues as a workload reduction tool.

JR: During my time as a graduate student in the Judge Business School, every student I spoke with privately utilized generative AI. This AI tool was purportedly utilized to support their efforts to craft, design, and write essays and assignments.

What was rather interesting is that initially the cohort was asked if they knew about ChatGPT when it first came out, to which the entire cohort raised their hand. However, when asked if they had used it no one raised their hand.

If so, could you briefly describe the ways it was used, and the specific tools used. What were the main challenges you faced and how did you address these?

SW: As an academic I have used it in:

Research: In the context of reading assistance, literature review, data analysis and as a writing assistant – primarily in qualitative educational and sociological research.

Teaching and learning: Helping developing materials, designing teaching, formative feedback and assessment, and to support inclusion, i.e., neurodiversity and English as additional language and as an actual medium of instruction.

Writing: This has been the most significant personally and professionally at also relates to the mention of neurodiversity and EAL above.

The primary challenge arose was in understanding the capability of LLMs in professional and educational contexts. It was initially and continues to be treated in the media as a new kind of intelligent search engine for looking up facts and information, however, I began to understand, after having experimented with the technology intensely for a period that it works in an entirely different way to a search engine or database. The training of a model involves the identification of linguistic patterns at multiple levels, from character/ symbol, to sentence, to genre, to discourse etc. LLMs e.g., ChatGPT are primarily linguistic tools rather than informational tools. ChatGPT in simple terms is capable of transforming a piece of text, from one form to another, as instructed or exemplified by the user, while preserving meaning.

To further address this overall challenge, I have written and published papers on the nature of the technology and of the relationship between human beings, society education and technology. I have also presented a number of workshops at my own institution (the University of Cambridge), other HEIs in the UK and in Europe, appeared on media in the UK and Ireland, contributed to podcasts and spoken at events for schools and school leaders.

VC: In classes as a foil to provoke discussion in lessons – e.g., for students to mark the computer’s homework. I have also used it to generate quick quiz Q&A, for students asking for more clarity on key topics, and for staff as a starter for worksheet and quiz generation and to help summarise research.

What was the result of your use of these tools, including any impacts?

SW: ChatGPT is integrated into my work, I use it extensively to assist me in reading, writing and research. I feel I can claim to be something of an expert primarily because I have spent considerable time experimenting with the technology so that it is of use to me and, increasingly, to my students, colleagues, and associates.

Opportunities and benefits

How do you think generative AI could be used to improve education?

SW: The primary benefit for generative AI in education is in inclusion. The barrier for many students whether it be through neurodiversity, cultural and linguistic, is presenting their ideas and understanding in a way that conforms to the educational context in which they are being instructed. For example, in the context of science education each discipline has specific sets of language, discursive practices that correspond to knowledge. The main challenge for many students in terms of inclusion is not necessarily the comprehension of the concepts and principles but employing the correct linguistic practices, textual forms and argumentation to express their thinking. This can be understood also in terms of genre/ discipline specific forms of the history essay, the English essay. LLMs can assist students in presenting their ideas in an appropriate 'academic' form independently of language i.e., also in the context of EAL.

Generative AI can also be used in smart tutoring to develop procedural and factual knowledge, however, there is a danger that intelligent tutoring systems, smart tutoring and technology-based adaptive teaching are seen as the sum total of education. It is important to recognise that the purpose of education is to support lifelong learning that is premised on the principle that modern liberal society is constructed on the notion of autonomous and agentic individual within and often in tension with sociality, complexity, and uncertainty. In this sense education that leads only to procedural and factual fluency does not meet these requirements. Education, then, requires human interaction as well as interaction with machines. It is important to emphasise the machine as an educational tool and not as education in itself.

Generative can be used in assessment, it can provide rapid formative feedback as an assistive medium between tutor and learning. It can be used in summative assessment, if combined

with comparative judgment to provide both 'grade', analysis of assessed material, and feedback to the learner. What my early trials and experiments show is that when used as an assessment, a higher level of thinking is required in the particular disciplinary area (and even in an interdisciplinary way) as there is less concern about whether the learner's work is in the correct form for the assessment.

It is important to outline some of the ways in which generative AI can be employed in a wide range of administrative functions at all levels of education and in assisting leaders make decisions. Generative AI can be used to solve scheduling problems that cannot necessarily be solved mathematically. It can be used in generating documentation and in personalised communication and it can be used to support that analysis of complex data sets.

JR: Generative AI could be strategically utilized to improve educational experiences by providing students with an opportunity to explore different ideas and perspectives because of the output or feedback the AI generates.

Secondly, students could learn how to improve their reasoning and logic on the basis of the output that the AI provides. In this context, AI can operate as a supportive tool to assist students structure their arguments and logic in a coherent manner.

What subjects or areas of education do you believe could benefit most from generative AI tools?

SW: Immediate benefits are obvious in terms of humanities, social sciences and with image and multimedia in arts and design. There are uses in STEM subjects, however, since these subjects are premised on procedural practices as the foundation of their disciplinary knowledge, then generative AI can be used to assist in developing conceptual understanding, individually and collaboratively but can also be used to interface with and translate so that students can instruct other machines e.g., Wolfram alpha or even in writing code.

JR: One of the most important areas that generative AI tools can be utilized to improve educational experiences is through the structuring and formatting of logical arguments. Students who actively use the generative AI can learn from their experience with AI feedback and results and how the generative AI structures its responses.

Concerns and risks

What are your main concerns about using generative AI in educational settings?

SW: My primary concern at present is that teachers, educators, and students are not receiving sufficient training in the new technology. There are many misconceptions and misunderstanding of what generative AI is (in the media it is often presented as an intelligent being that can write students' essays and help them cheat) and this needs to be addressed educationally. We do, however, need, with some urgency a national strategic approach to address the integration of generative AI in education to support this process. Generative AI prompts the need for very practice-based research and development alongside collective and strategic oversight and support. It is not something that will be integrated by simply relying on local or entrepreneurial initiatives.

For many the overarching concerns about generative AI concern more abstract (but nonetheless important) ideas about whether it represents a force for good or for bad in society and education. There are also questions about authenticity and how the individual's work is authenticated. These are important but it is important to recognise that the technology itself is not intelligent in a human sense but can plausibly appear so. Like any technology it is through the deliberate or ignorant actions of people that technology can be used to injure, damage or kill others. Generative AI is no different in this regard. It is neither good nor bad.

The issue of authenticity prompts some big philosophical questions about the nature of the agent and individuality in modern society. However, at a more practical level the approach I have taken with students and educators in guiding them in the fair and ethical use of generative AI is to ask the question 'who is deciding on the content?'. This becomes a significant question in relation to generative AI as it does and can provide content information and offers fact, however, the

veracity of this output must always be questioned. In sum, if it is being used as a language tool helping to develop and craft writing in the appropriate form then that is authentic use, any facts must be verified, considered, and referenced as necessary. Since generative AI generates content as well as being able to transform text while retain the meaning means there is new kind of grey area, where the delineation between writer and machine was much clearer. But I agree with many other educators in my workshops who have suggested this presents a new and valuable opportunity for learning.

VC: Equity of access. Learner autonomy. Undermining the ‘work’ of learning – we don’t yet know if using a tool like ChatGPT to write will provide the same ‘development’ that forming ideas long hand might have. Current learning theory suggest that effort begets development. In some areas this can be a barrier (e.g., cognitive load theory), in others we know when the effort required is too low, then development does not happen. Of course, there is a need to recognise that ‘effort’ in writing does not necessarily translate in to ‘substantive’ effort.

JR: One of the major potential concerns is that students relay on generative AI to provide them with the basis for research. In other words, it is possible that students become lazy and rely on AI rather than thinking independently and questioning the responses they derive from generative AI.

The second major concern is the ability of generative AI to formulate and provide feedback that is made up. This is evinced in cases and examples where generative AI creates artificial arguments, authors, and citations.

If at all, have these concerns impacted your use of generative AI? Please explain how.

SW: Yes. Primarily, my use of generative AI has been driven by trying to understand the technology, especially in terms of its practical applications but also in understanding the role in a more abstract way of generative AI in education and society. I have played a lot with ChatGPT in many different ways.

VC: Yes. We have talked a lot about what AI means for the ‘how’ and ‘why’ we are teaching writing, and assessment, for example.

JR: These concerns have certainly impacted the way I have utilized generative AI. It has made me more critical and sceptical of the feedback that is received. In short, it means that each response is taken with a grain of salt ensuring that responses that are generated are not blindly accepted.

Are there specific subjects or areas of education where you believe generative AI should not be used? Why?

JR: It could be argued that generative AI should not be used for applications, essays, and personal statements. The logic being that this represents a potential competitive advantage for students who have access. Students who do not have access could be at a disadvantage and could create further opportunity, equality, and equity gaps in the education field.

Ethical and legal considerations

If any, what are your views regarding ethics, data privacy and security when using generative AI in education?

SW: The issue of data privacy (and intellectual property) is really complicated by generative AI. Legal notions of these around what belongs to the individual and what is generated by the individual. The need then is to keep that private or ensure that the individual gives permission for the use of data generated by or about them. The problem here is that legally the ideas on this refer back to printing technology, replication and 'copyright'. However, generative AI is not a replication technology but is one that operates on the level of semantic structures (i.e., patterns that exist across individual 'copy'). It will be interesting to see how politicians and lawyers will adapt.

JR: There are serious concerns about the ethical use of generative AI. As noted above students who have access to generative AI are at a potentially greater advantage in comparison to those who do not have access or simply cannot afford access. This leads to questions such as whether it is ethical that only wealthy students and institutions have access to AI, or if it possible that generative AI could create a further division in educational opportunities? Contra wise, could students who don't study and prepare themselves get better results than students who did study and prepare, yet did not use generative AI to craft their assignments?

Future predictions and enabling use

How do you see the role of generative AI in education evolving in the future?

SW: I believe it will be a slower integration than is often presented. On one hand generative AI is transformative, but in terms of the transformation of society and its functions this is dependent on the rate at which generative AI is integrated into institutions, organisations, and everyday life. This, as I hope I have emphasised, is not so much about the development of a ‘killer’ app or apps but it is how people start to make use of it in innovative ways in the work and in their personal lives. It is from these bottom-up initiatives that apps can be developed. It is interesting that generative AI prompts this ‘flip’. Of course, generative AI will be used and developed in a top-down way but its inherent personalisation mean that the most powerful uses will be developed from with generative AI as the tool and as the core of the application. This can be explained in terms of understanding the technology’s role and emergence in individualised and personalised society.

VC: This will snow-ball, and if schools and universities don’t keep ahead of the curve, they will be left behind by students who are going to use this anyway.

JR: I see the role of generative AI evolving into a supportive educational tool in the future. I believe that generative AI will allow students to develop their writing, analytic, and reasoning skills. This can take the form of learning how to structure and mimic the logic and reasoning the generative AI utilized to provide feedback from specific prompts.

It must also be emphasized that historically, innovations have been utilized for purposes that were initially outside their intended scope. Additionally, the innovation literature also highlights that users often shape the evolutionary course of a given technological innovation. This form of user innovation

suggests that predicting the future use of generative AI is extremely difficult.

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It must also be emphasized that historically, innovations have been utilized for purposes that were initially outside their intended scope. Additionally, the innovation literature also highlights that users often shape the evolutionary course of a given technological innovation. This form of user innovation suggests that predicting the future use of generative AI is extremely difficult.

What support do education staff, pupils, parents, or other stakeholders need to be able to benefit from this technology?

SW: There is an urgent need for strategic body that can provide support and training for educators and help facilitate and support the integration of AI. It needs to connect government, education institutions, interdisciplinary expertise, industry and technological companies, and media (to develop more informed public discourse).

VC: Training, training, training. Dialogue / engagement with professional bodies (e.g., the Chartered College of Teaching). Guidelines for companies on the responsible use. Discussion about assessment and England's overt focus on rote learning (we are a bit of an outlier on this).

JR: There will naturally be a period of time that passes that is necessary for these stakeholders to familiarize themselves with the potential benefits and risks that AI can generate.

The other factor that is necessary to consider within the context of time is the educational period. These stakeholders need to be educated on what exactly generative AI is and how and why it can be used in a positive manner. During this educational period, it should become clear as well what are the potential negative impacts if the technology is not utilized in an ethical manner.

Is there anything else you would like to add on the topic of generative AI in education?

SW: Finally, I would like to emphasise the need for a strategic approach by the UK Government and not to rely entirely on entrepreneurial initiatives from the educational technology sector to develop solutions. My initial work in the integration of generative AI into education at all levels shows that sustainable implementation and integration leading to the development of applications must emerge from practice and

context and must involve the contributions from practitioners and learners. Furthermore, in a nationally differentiated global system of education, it will be the jurisdictions that adopt a practice-oriented strategic approach that will have an advantage. However, the challenge for politicians will be finding legitimacy for such policy.

JR: Generative AI is here whether we like it or not. With any innovation, once the technology has been introduced it is essentially 'out of the bottle' and it cannot be but back. Educational institutions must learn to adapt and control its use within specific boundaries. This requires developing specific guardrails for the ethical and equitable use of generative AI in a manner that ensures academic integrity and equality in opportunity.

Glenlead Centre

The Glenlead Centre researches and delivers policy solutions to legislators, regulators, policymakers, universities, public sector bodies, non-governmental organisations, and private enterprise. We lead projects focussed on building stakeholder capabilities and capacity to better inform decision-making on policies for a digital and AI-driven future.

Our mission is to conduct and leverage high-quality research and support human-centric policy development and solutions in the digital and AI for the benefit of the public good. Our work is designed to ensure that decision-making affecting our digital lives are informed, balanced, and adapted for the future. Our aim is to encourage responsible, ethical, and human-centric technologies that will contribute to epistemic justice and a more prosperous and sustainable future.