BCS Consultation Response:

Department for Education's call for evidence on generative artificial intelligence in education.

Call for evidence

The Department for Education issued a call for evidence on how generative artificial intelligence (AI) is being used across education in England, and the opportunities and risks it presents. In addition to being the professional community for technology with 70,000 plus members, BCS' activities include Education and Public Benefit, for example supporting thousands of computing teachers as part of its peer-to-peer network through Computing At School (CAS). Additionally, its Learning and Development division develops and maintains professional standards and certification, and is an Ofqual-regulated awarding body, plus BCS is an approved apprenticeship end-point assessment organisation (EPAO). We also accredit computer science courses at 110 universities. BCS' key areas work together to 'Make IT Good for Society' and help ensure that current and future IT professionals are competent, ethical and responsible, whatever their role or area.

This consultation ran from 9:30am on 14 June 2023 to 5pm on 23 August 2023.

BCS response

Have you or your institution used generative AI tools in an educational setting? If so, could you briefly describe the ways it was used and the specific tools used?

As an awarding body:

We have yet to use generative AI tools in terms of development, but we expect to use it for exam authoring, which will aid question creation and help maintain large exam banks. It will help, for instance, if exams are compromised and questions have to be quickly replaced.

From an EPAO perspective:

Used wisely, generative AI can be a valuable tool for apprentices, supporting activities including:

- Gathering evidence.

- Structuring portfolios, case studies and reports.
- Creating learning aids such as flashcards and quizzes and summarising articles for reference.
- Producing original content as a starting point for written evidence
- Writing, testing, and reviewing software code.

- In schools and colleges, members of the Computing At School community have used generative AI tools to:
- Create worksheets and resources, including modifying existing resources for students with particular needs.
- Create assessment activities like tests and exams, and produce mark schemes.
- Summarising complex text, e.g. versioning explanations of an aspect of computer science (such as Blockchain) for the school-level audience.
- Provide additional support for struggling students, e.g. through interactive Q&A sessions with an AI tool.

What were the main challenges you faced in using generative AI, and how did you address these?

From a school and colleges perspective:

Teachers in schools and colleges in the CAS community reported that the key challenge was rethinking homework tasks to properly focus on students demonstrating knowledge through critically appraising AI outputs.

From an EPAO perspective:

Inappropriate use of AI tools, not understanding the reason for using the tool, or providing a rationale for employing it.

Educators/tutors/assessors limited understanding of (or collaborative agreement/policy on) the use of AI - e.g., what's acceptable, and how it should be evidenced.

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

From an EPAO perspective, providers are seeing AI tools as an opportunity to enable apprentices to focus on high-order competencies required by their occupation and manage lower-level processes through AI tools - e.g. basic coding.

Teachers in schools and colleges in the CAS community are looking for guidance. On the one hand, they welcome the support that AI tools can provide; on the other, they are concerned about managing students' use.

Opportunities and benefits:
How do you think generative AI could be used to improve education?

Ignoring AI poses a risk of being left behind and missed opportunities to improve occupational functions - e.g., mundane/repetitive tasks and address large-scale complex problems. Educators need guidance on getting the best out of AI while avoiding its pitfalls.

For instance, a recent survey of computing teachers carried out by BCS found that schools were unprepared for the impact of AI tools, but the consensus was that learners should not be banned from using tools like ChatGPT and instead, be helped to employ them appropriately.

AI tools can speed up learning and make it more effective, taking on the grunt work to make room for higher-order reflection that produces deeper learning and better results in the classroom and workplace. Rather than spending hours searching for relevant source material, learners can now find what they need quickly and can cut to synthesising and evaluating the information. However it is also important that the use of AI is referenced, as is the relevant source material.

In schools and colleges, for instance, AI could be used as a tool to support:

- Students: through intelligent tutoring, providing model answers, supporting students to pursue a subject in more depth, developing their analytical skills ('ask ChatGPT to generate five explanations of xx, evaluate each explanation ….') and providing feedback on their work.
- Teachers: it could save them time when they generate resources, assess students' performance against model answers, and analyse students' performance to identify areas of improvement.
- The school's general management, such as evaluating the impact of, for instance, timetable changes.

Following consultations with leading digital apprenticeship training providers and computing teachers, BCS has set out the following ten measures to support the adoption of AI in learning and assessment:

1. Training for educators: BCS recently recommended that AI become part of teacher training courses. Schools should teach children how to use AI from 11, with pupils working with tools like ChatGPT to understand their strengths and limitations better. The scope of the Computer Science GCSE should include a focus on how AI is built and consider its risks and opportunities. BCS also recommends that young people need a new alternative digital literacy qualification to the GCSE, emphasising AI and other modern digital skills.

We believe that many digital apprenticeship providers are already ahead of the curve with this issue. However, we also feel apprentices could benefit from line managers who thoroughly understand generative AI and can support them to get the best out of it.

2. Ethical use: Schools, colleges and apprenticeship training providers should train staff to use AI ethically and effectively.

3. Human judgement: Highly trained expert assessors are the most powerful defenders of academic integrity and already play a leading role in our assessment plans. They can examine evidence for authenticity, consistency, and coherence and can detect nuances that automated systems might miss. For example, they can spot fabricated information (which AI is well-known for), unexpected language patterns, or a generic focus that doesn't apply to the learner's context. For examinations, remote proctor or invigilation guards against most forms of cheating.

4. Multimodal evidence collection: With apprenticeships, instead of relying on unsupervised written evidence, we use a variety of evidence types, such as video recordings, oral presentations, practical demonstrations, and in-person interviews. This multimodal approach makes it more difficult for AI-generated evidence to pass undetected. Aside from these risks, there are better ways to observe learners applying their knowledge and skills in the workplace than written tasks.

5. Forensic analysis: Where there are doubts about authenticity, we use forensic analysis techniques to examine metadata, file properties, or digital footprints for signs of tampering or AI generation

6. Randomised spot checks: We conduct spot checks by selecting evidence for further scrutiny. This can identify anomalies that warrant deeper investigation, and at BCS, we moderate a significant proportion of all apprenticeship assessments.

7. Rigorous identity verification: We use robust verification to confirm the identity of each person submitting evidence. It can involve document verification, biometric identification, or secure authentication methods to ensure evidence is associated with the correct person. While this doesn't directly address using tools like ChatGPT, it could protect against more advanced forms of AI-based cheating, such as deepfakes, in the future.

8. Collaboration and data sharing: We collaborate with educators, technology providers, and other assessment organisations to share information, best practices, and emerging techniques for detecting AI-generated evidence. Collaborative networks enhance the collective ability to identify and address threats.

9. Horizon scanning: Teaching and assessment must continually adapt to stay ahead of emerging risks. Perhaps AI itself is one of the best ways to detect AI-generated evidence, and anti-plagiarism tools like Turnitin already claim to be able to do so for written work. However, many of these tools are hosted outside of the UK, and it's vital to check that they comply with GDPR and other relevant regulations.

10. Clear policies: We welcome the guidance from the Joint Council for Qualifications: AI Use in Assessments: Protecting the Integrity of Qualifications. We also agree that it is important, as the guidance states that an agreed approach and policies must now developed by centres to 'ensure these can also address the risks associated with AI misuse.' Training providers could also publish new policies to guide decisions about using and referencing AI within assessments. They could also update existing plagiarism policies to account for AI misuse. It will only be effective if it's communicated to learners and staff so everyone understands what is expected of them.

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

Generative AI can support all forms of learning and assessment across all occupational and educational areas.

That's provided lecturers, teachers leaders are trained in the use of generative AI to have applications across all aspects of teaching, learning, assessment and management.

Concerns and risks:

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

From an apprenticeship perspective, AI is no substitute for the specialised knowledge the apprentices must demonstrate, and skilled assessors will quickly notice misuse or overreliance on the technology.

Another main concern is that it will be used uncritically by students, teachers/lecturers and managers. The worries about students using generative AI to create work without intellectually engaging themselves are well documented.

When teachers or schools use AI, there are risks if, for example, it is used in making assessment decisions when the AI has not been appropriately trained with data from a fully representative cohort. Also, the issues of bias and 'hallucinations' are well documented.

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

Not enough is known yet to comment.

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

As mentioned above, there is a risk of removing specialist expert knowledge, and generative AI should not replace humans in making high-stakes assessment judgements.

Ethical and legal considerations:

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

AI brings enormous ethical and legal considerations, mainly because most existing AI systems still need to be trained on data created by a sufficiently diverse range of school-age students and apprentices to avoid bias. Plus, there must be significant controls to protect the use of students' personal and sensitive data.

Future predictions and enabling use:

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

Subject to teachers and school leaders being correctly trained, it could be used as a support for teachers to help prepare materials and assess students and as a management tool for the school itself.

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

All education staff need training in AI use, including:

- Understanding how systems use training data and how this can introduce bias and limit the system's range of expertise, and a basic understanding of how AI systems use statistical modelling rather than understanding in a human sense.
- Using AI effectively, such as creating suitable prompts for large language models.
- Exploring the pedagogical implications, such as how to teach students and apprentices to use the tools to develop their knowledge and skills and critique the output.
- Understanding the ethical implications of AI, particularly concerning bias and protecting pupils' and apprentices' data.

- Knowing which AI services to select for effectiveness, transparency and ethics.

What activities would you like to see the Department for Education undertaking to support generative AI tools being used safely and effectively in education?

- Educators' knowledge and skills: include AI and other emerging digital technology in the training of schools/college teachers and leaders.
- Require schools and colleges to develop and publish policies on how they will ethically and effectively use AI and other digital technologies in the classroom and in the management of educational establishments. A similar approach could be adopted by the Office for Students for HEIs.
- AI tools and services: work with the UK EdTech industry on a code of conduct for developing ethical AI tools at all levels.
- Publish guidelines for schools and colleges on selecting ethical and efficient AI tools and services.

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

It is vital to avoid 'knee-jerk' policymaking. BCS welcomes this consultation as a first step towards developing a future-facing strategy that exploits the opportunities while managing the risks. It should be part of a systemic approach encompassing the broader digital landscape in education and the training of the country's future workforce.