STEM Learning would like to thank those that contributed to the discussion and paper: Arcadis, Bede's School, Bourne Education Trust, Cisco, Intel, Kainos, Maganexus, Microsoft, The Harris Federation and University College London

AI ROUNDTABLE

What opportunities and challenges does AI present for teachers and how can our education system ensure we have the right skills and knowledge for the future of AI?

On 1st February 2024, STEM Learning hosted an experts roundtable at the National STEM Learning Centre in York which brought together industry, education and government to discuss Artificial Intelligence. Specifically, discussing the opportunities and challenges that this fast-growing area presents for teachers and teaching. Attendees also discussed how, collectively, we can work together to ensure that everyone can be confident users of AI and young people can be given the skills and knowledge to be builders of AI/STEM professionals.

Summary

There were several outputs and recommendations that arose from the discussion (relevant to educators, government, industry, and STEM Learning) but one clear point of agreement is that **it is a collective effort of all of us to make the most of the opportunities AI brings us, navigate and overcome the challenges and ensure the UK has the right skills and knowledge for and on AI**.

It is clear that all educators, including education leaders, need more support to feel confident themselves in understanding AI, using AI in schools, and teaching about AI. This is essential before it is applied in teaching and before they educate young people on AI. Guidance, policies, and professional development on AI are therefore essential to support all teachers.

Some aspects of the education system pipeline need fixing to produce the quantity of talent and additional skills needed for roles that will use, implement, or build AI in the future.

- Inclusivity and AI needs to be threaded through learning, the curriculum and extra-curricular activities (including careers provision).
- Young people need exposure to industry and employability skills that will inspire and enable them to get a job.
- Foundational skills from primary through secondary are essential to ensure that young people can be confident users of AI as well as be STEM Professionals.
- Universal access to learning about how to use AI safely and responsibly is a right. This requires all children to have access to the devices needed to support these outcomes.

Outputs of the discussion

- There are **'Users' of AI** (the significant majority), **'Implementers' of AI** (the minority), and **'Builders' of AI** (the smallest minority) – all of which require different knowledge and skills (some foundational and some digital);
  - Users need:
    - Contextual understanding of what AI is, its benefits and limitations and how it is applies to everyday life – instilling a system of values by which we use and interact with AI
    - Essential digital skills
    - Critical thinking skills
    - Understanding of personal data value/privacy and AI safety
    - Curiosity and resilience, confidence with trial and error
  - Implementers need all of the above plus:

        - Employability skills such as time management, team working, confidence, resilience, and communication skills
        - Business skills such as basic financial management
        - Data management skills
        - Computer Science qualifications – specifically systems architecture and AI implementation
        - Industry specific knowledge and skills
    - Builders need all of the above plus:
        - Physics and Maths qualifications
        - Data science skills
- There are concerns about there being a **digital AI divide** between schools and regions which will stem from schools not having access equally to the tech and to industry engagement and they will be those already suffering from other forms of deprivation, lack of resources and time, reinforcing the divide.
- AI has the capacity to personalise around an individual's needs, skills, capabilities and interests as a significant educational asset.
- AI is not limited to Computer Science and can be **applied to the wider curriculum including arts and humanities**, it should be taught as:
    - **ethics** around AI – how to use AI responsibly
    - **critical thinking** – being able to know its limitations and how it applies in everyday life
    - sparking **curiosity/creativity** – encouragement to experiment with what is/is not possible

  There is still a need, however, to increase the number of young people taking computer science related study.
- Whilst the education system is helping create some talent with the right skills, there are **not enough people**, **with the right skills,** coming through the UK pipeline that industry needs, especially for some of its deep specialist roles. Additionally, there is a huge **gender diversity issue** that needs to be addressed to both solve the skills crisis and ensure future AI tools are inclusive. Some of the causes of this are that:
    - There is a **'leaky pipeline'** through education around careers in STEM and wrap around support which gives work/life context to what young people are learning, particularly the jump from primary to secondary school and into GCSE options, and this is amplified around gender.
    - Misconceptions from some students, families and communities on the opportunities offered by STEM careers, reinforcing stereotypes and limiting
    - There are **gaps in the curriculum** to support future Implementers and Builders of AI and some of the curriculum is overcrowded which leaves less time for the wrap around support that inspires and motivates young people into industries where we have skills gaps.
    - We need to get more women into roles in industry where AI is implemented and built. This is an issue that everyone needs to work together to fix this
    - **Careers provision** in schools needs to be strengthened and industry must be part of it to inspire more girls taking up computer science, physics, and maths
- We should be starting with creating the conditions for all **teachers in learning about how to use and experiment with AI responsibly and safely** – this will build their understanding and confidence so that they can then, teach young people about it and apply it to their learning.

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Recommendations

Education

- Education leaders need to be vocal in their needs around technology and guidance
- Schools that are excelling in this area should share best practice and learning with other schools to ensure that AI tools and applications are more equally accessible – this could be done via the Computing Hubs network
- Create and implement school policies and procedures to guide and support teachers to use and teach about AI
- Ensure all staff have training around diversity and inclusivity, especially in subjects/industries where there is a gender gap such as Computer Science so that more young people, especially girls, take Computer Science related study.

Outcomes: narrow the digital AI divide, more teachers using and feeling confident with AI, all MATs/schools having policies/guidance on AI

Government

- Remove barriers to technology and address the digital divide in schools by ensuring they have adequate access to equipment and AI platforms and software
- Encourage and facilitate greater industry involvement in young people facing settings such as STEM ambassadors and student enrichment
- Educators need clear and rapid guidance from government on teaching AI safely to young people to enable schools to teach them responsibility and provide assurance to parents and carers
- Any future AI skills policy should include and support an 'educator persona'
- The Digital Skills Framework should include how to use AI responsibly
- Look at the careers provision across schools and further strength employability skills within the provision as well as industry engagement with young people at all stages of their education
- Ensure that policies on skills in STEM build the following foundational skills:
    - Critical thinking
    - Digital skills
    - Data science
    - Employability skills including (but not limited to) communication and team working
- Include skills within the curriculum that relate to data and critical thinking so that young people are well informed and empowered as well as equipped for a future where AI is prevalent
- Continue to support young people into Computer Science related study.

Outcomes: narrow the digital AI divide with equality of access to technology and kit, published call to actions for industry, published government guidance for schools on using and teaching about AI

Industry

- Recycle unwanted devices that are still supportable and have a usable life outside of industry and work with STEM Learning and other partners to provide a full package of training and support within schools that need these devices the most.
- Get more involved with young people and be student facing by becoming STEM Ambassadors and sponsoring student enrichment activities

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- Ensure all staff have training around diversity and inclusivity and be inclusive when recruiting and upskilling people into STEM careers
- Be more vocal and proactive in communities and schools (sign up to the TechTalent Charter) to get more young people taking up Computer Science related study
- Partner and collaborate with different experts such as STEM Learning and educators

Outcomes: more women in AI roles, recycled devices and equipment going to schools/educators, increasing numbers of STEM/Computing Ambassador

STEM Learning

- NCCE Computing hubs can offer a source of technology devices for schools
- Create and deliver relevant extra curricula resources with industry that are available to young people throughout their education and especially, at key decision points
- Train teachers and leaders in education to:
    - Understand and implement technology across their settings
    - Be responsible users of AI
    - Educate young people on how to be responsible users of AI
- Provide student enrichment activities that allow young people to experiment and be curious with AI tools and applications in a safe space
- Link industry to young people through STEM Ambassadors
- Support careers provision and inspiration through Destination STEM that bridges some of the gaps that schools lack the capacity to do

Outcomes: increasing number of girls in STEM subjects, development of AI CPD to support teachers, more industry collaborative programmes delivered to schools and young people

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Table of recommendations by outcome and persona:

Round table output	Outcome needed	Education Leaders	Educators	Government	Industry	STEM Learning
Digital divide	Universal access to learning about AI. Reduce/remove obstacles to access.	Engage with partners to get access to support and devices for those children who are digitally excluded.		Invest more in schools that do not have devices.	Donate kit that's still usable but not needed.	
Leaky pipeline	Increased girls in pipeline into STEM/Tech/AI roles.	Ensure school wide inclusivity training, including but not limited to Comp Sci staff, to make sure their behaviour isn't impacting student choices around tech and other STEM careers.	Regularly take part in gender inclusion programmes such as I Belong.	Help drive greater industry involvement through a campaign focused on businesses to volunteer in schools using programmes like STEM ambassadors	More volunteering in schools as Computing Ambassadors, female role models, etc.	School wide 'I Belong' inclusivity training for technology roles.

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Round table output	Outcome needed	Education Leaders	Educators	Government	Industry	STEM Learning
Foundational skills for all	Employability and essential digital skills for all. Data privacy/AI safety.	Ensure school wide training for staff relating to essential digital skills and data privacy/AI Safety.	Teach how to be responsible and safe users of everyday AI, beginning in primary schools. Teach Skills Builder type outcomes, beginning in primary schools.	Include how to use AI responsibly and safely in the essential digital skills framework. Include how to work in a team with 'robots' as part of employability training.	More volunteering as STEM Ambassadors supporting employability skills.	Train all educators, including primary, in how to be responsible AI users and how to teach children to be responsible users. Provide more detailed training for safe-guarding leads.
Cross curriculum activities	AI understood as relevant to all subjects and included across all subjects.	Ensure all teachers learn about AI. Encourage AI use across the curriculum eg supporting creative writing.	Include AI usage in cross curricula.	Strengthen data knowledge across the whole curriculum.	Work with schools to connect the dots between subjects and real-world contexts.	Create and deliver teacher CPD about AI to **all** teachers.

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Round table output	Outcome needed	Education Leaders	Educators	Government	Industry	STEM Learning
Closing gaps in the curriculum	Contemporary AI-related contexts included in existing teaching and curriculum materials.		Work with industry to provide extra curricula activities that close the current gaps. Teach how to be responsible implementers of AI using extra curricula activities until such a time as the curriculum includes AI.	Streamline Comp Sci curriculum. Introduce AI for Implementers into the CS curriculum.	Work with schools to deliver extra-curricula activities that close the current gap. Partner with experts, don't try to do it yourselves. Support government in identifying and streamlining core Comp Sci curriculum content and creating AI content.	Provide services to industry to map their needs to curriculum to identify gaps and create extra-curricula solutions for industry to deliver in schools. Support government in identifying and streamlining core Comp Sci curriculum content and creating AI content. Add contemporary AI-related contexts to existing materials

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Round table output	Outcome needed	Education Leaders	Educators	Government	Industry	STEM Learning
Supporting educators with guidance and training in use of AI	Educators confident about using and teaching about AI	Support government with Educator persona in policy creation. Create school policies and procedures to guide and support teachers and to deliver government policies and guidelines on AI. Train teachers in how to coach children with high levels of talent that exceed the teachers knowledge and experience. Ensure all teachers understand the relevance of AI to their teaching and how to use it responsibly.		Include the Educator persona in future AI Policy or skills policy creation. Create policy for schools around teaching AI safely that support and enable teachers to teach and have sensible conversations with parents and carers	Volunteering in schools as Computing Ambassadors. Supporting access to latest technologies through sponsoring immersive environments for teachers to safely experiment.	Support government with Educator persona in policy creation. Train education leaders in how to turn Gov policy into school level policy, particularly around technology usage. Train teachers to experiment in using AI

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Round table output	Outcome needed	Education Leaders	Educators	Government	Industry	STEM Learning
Supporting young people with good career advice	Young people understand the variety of roles and have a wide view of the many opportunities available if they take Comp Sci at GCSE					