

Digital Skills and the STEM Workforce of the Future

Science and Stormont

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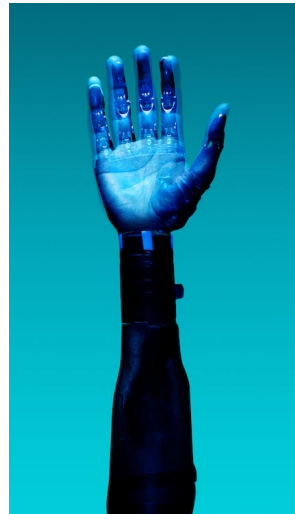
First, a short puzzle...

1	2	4	8	16	32	64	...
							?

A single 10 p piece is put in the first square of a chess board, with two stacked on the next, four on the next and so on. We continue over all 64 squares of the board.

Estimate (don't calculate) **how high** is the pile of coins on the very last square?

Engineering skills landscape



- Engineering and the sciences are core to driving societal change, delivering Net Zero and a Digital Future
- The IET's annual skills surveys
 - Measures the engineering skills landscape
 - Engages different engineering industries
 - Point towards upskilling solutions
- STEM workforce shortfall >173,000
- 47% of engineering employers report a skills gap

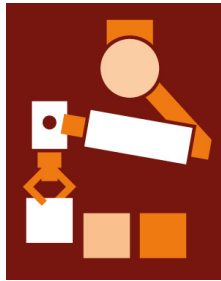
Focus on digital skills



- The UK is leading the world in digital innovation
 - Globally leading universities & engineering faculties
 - World's best AI research
 - More tech unicorns than France and Germany combined
- The digital future presents great economic and social opportunities
- BUT there is a digital skills gap
 - Economic cost of the UK's digital skills gap at £63bn per annum

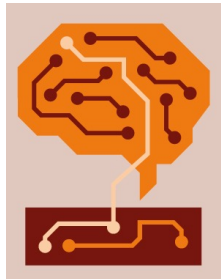
Employers are already embracing emerging digital technologies

- More employers have staff that use emerging digital technologies
- There is significant variation between engineering sectors in terms of uptake
- There are relevant Northern Ireland initiatives to help address these challenges



47% of employers have staff that regularly use robotics / automated equipment

Centre for Industrial Digitalisation, Robotics and Automation (CIDRA); Advanced Manufacturing Innovation Centre (AMIC) City Deals



45% of employers have staff that regularly use AI / machine learning

**AI Collaboration Centre (AICC).
Cognitive Analytics Research Laboratory (CARL) City Deal
Global AI Ethics Centre ?**

Employers want more advanced digital skills to drive growth

- Emerging digital technologies will drive innovation and productivity
- However, there are inadequate skills to take full advantage



31% of employers say AI / machine learning will be important to sector growth by 2027

Other important areas:

- Data analytics (39%)
- Cloud computing (36%)

Closing the digital skills gap

- 1 in 4 engineering employers report hiring difficulties linked to digital skills shortages
- Only 11% of UK workers possess adequate advanced digital skills
- We need a revolution in upskilling, reskilling and lifelong learning
- Engineering employers support this, and most describe their workforce as 'agile'



58% of employers approve of government support for reskilling



39% of employers support more funding for specialist apprenticeships



33% of employers support better careers advice in schools

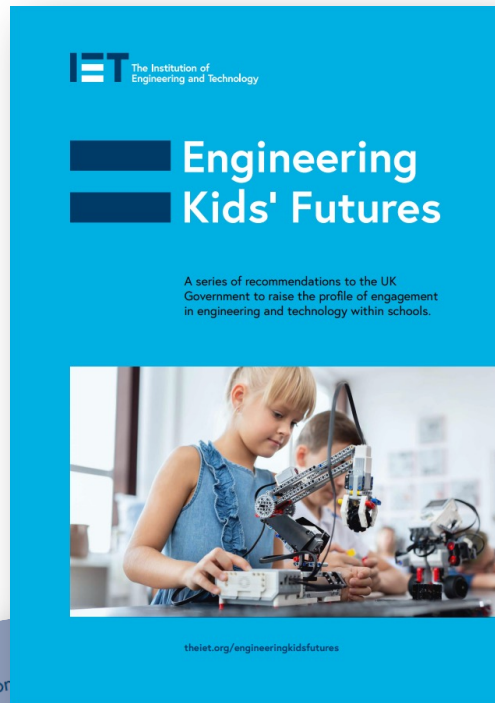
How are you getting on? Any guesses?

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Education is key



- The IET has also undertaken research into the profile of engineering and technology in schools
- More young people should be encouraged into engineering
 - 45% of young people don't know what engineers do.
 - Currently only 0.4% study GCSE engineering.
- Organisations like Primary Engineer and Sentinus help Schools raise awareness

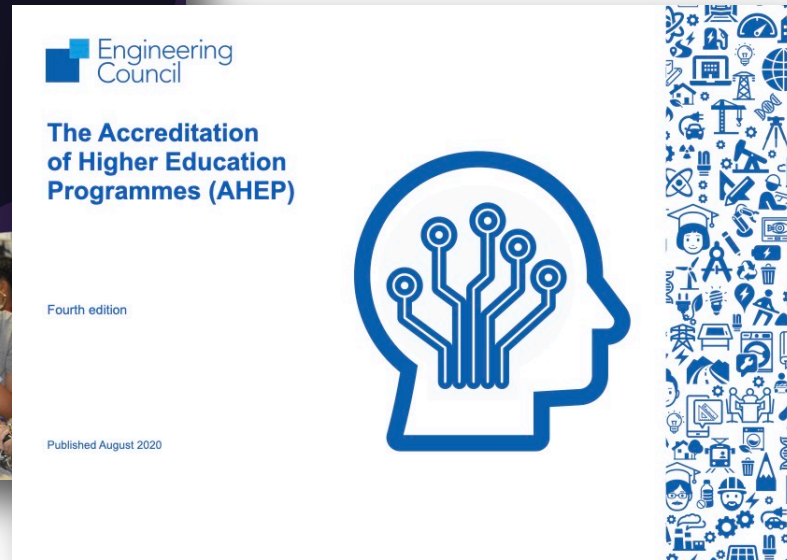
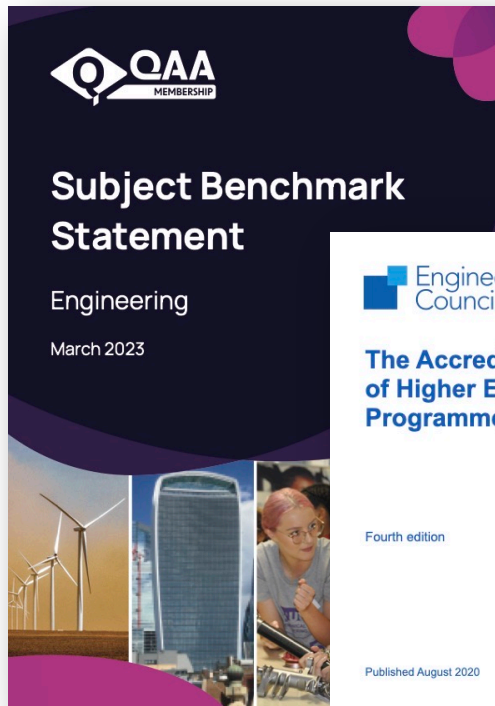


Primary Engineer®
...the first step



STATWARS®

More emphasis on “soft” skill areas in Higher Education



- Engineering Higher Education shows accelerating movement into societal matters
- Ethics, Sustainability and EDI are taking a much higher profile
- The Royal Academy of Engineering hopes to have graduates in 2024 being sufficiently upskilled in Sustainability to make a difference in industry and so society.
- The Royal Academy, the Engineering Professors' Council, Engineering without Borders and Siemens are working on a Sustainability Toolkit.





Conclusions

- We must plug the UK's £63bn/year digital skills gap
- UK industry and academia are leading the way,
 - but engineering sector employees require better advanced digital skills such as AI and data analytics competencies
- Maximising the economic opportunity starts with developing advanced skills
- In Northern Ireland, the City Deal / Regional Growth Deals are highly aligned to closing these gaps – along with, for instance the AI Collaboration Centre (AICC). Focusing on the success and capacity of these projects will be key.
- A positive start - adapting and improving existing policies to support
 - upskilling of existing employees,
 - technical and specialist apprentices,
 - better career advice and awareness raising in schools?

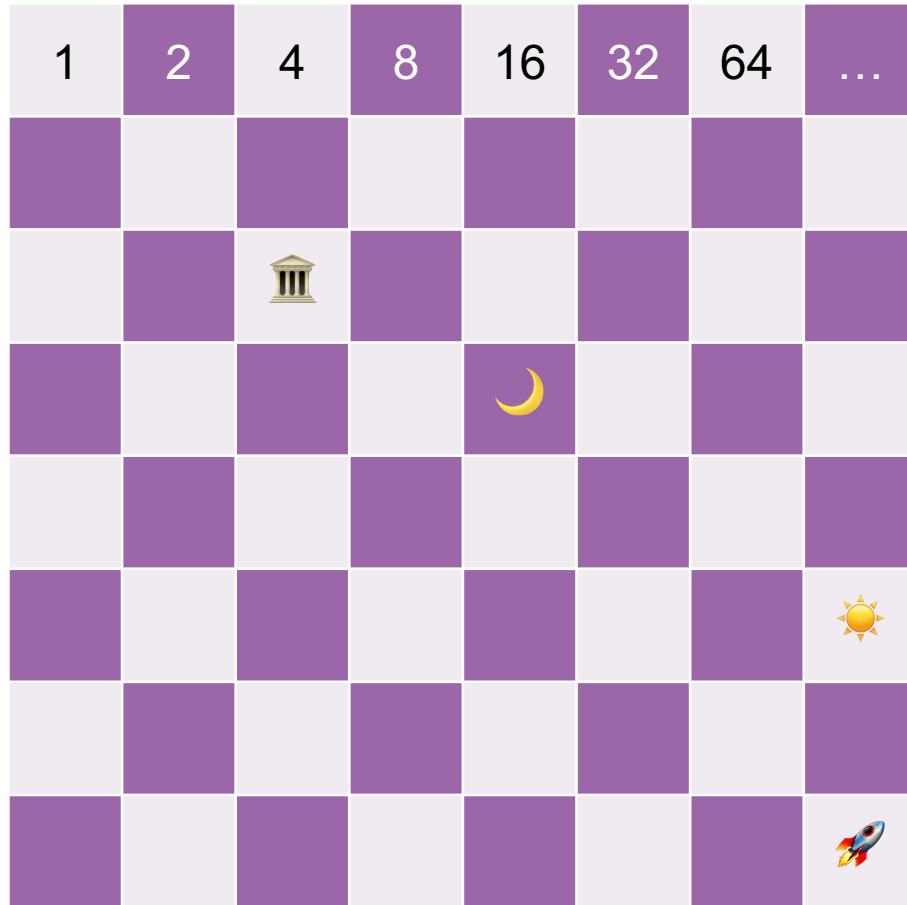
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The Solution...



To put it in perspective...

by the 19th square, the coins are higher than the radio mast on the Empire State building; by the 29th square, the pile of coins would have reached the Moon; by the 48th square, the pile of coins would have reached the Sun; by the 63rd square, one from the end, the coins are a light year high.

My bolted on “moral of the story”...

1	2	4	8	16	32	64	...
		🏛️					
				🌙			
							☀️
							🚀

You might have seen this:

$$(1 + 0.01)^{365} = 37.783...$$

$$(1 + 0.00)^{365} = 1$$

$$(1 - 0.01)^{365} = 0.025...$$

In other words, a bit more effort / right input rapidly compounds results – and a bit less degrades it.



Find out more:
www.theiet.org/skills