

(A sprint around) **the National Landscape on Teaching STEM in Schools**

Delivering Excellence in Teaching STEM in Schools - March 9, 2022

Dave Gibbs

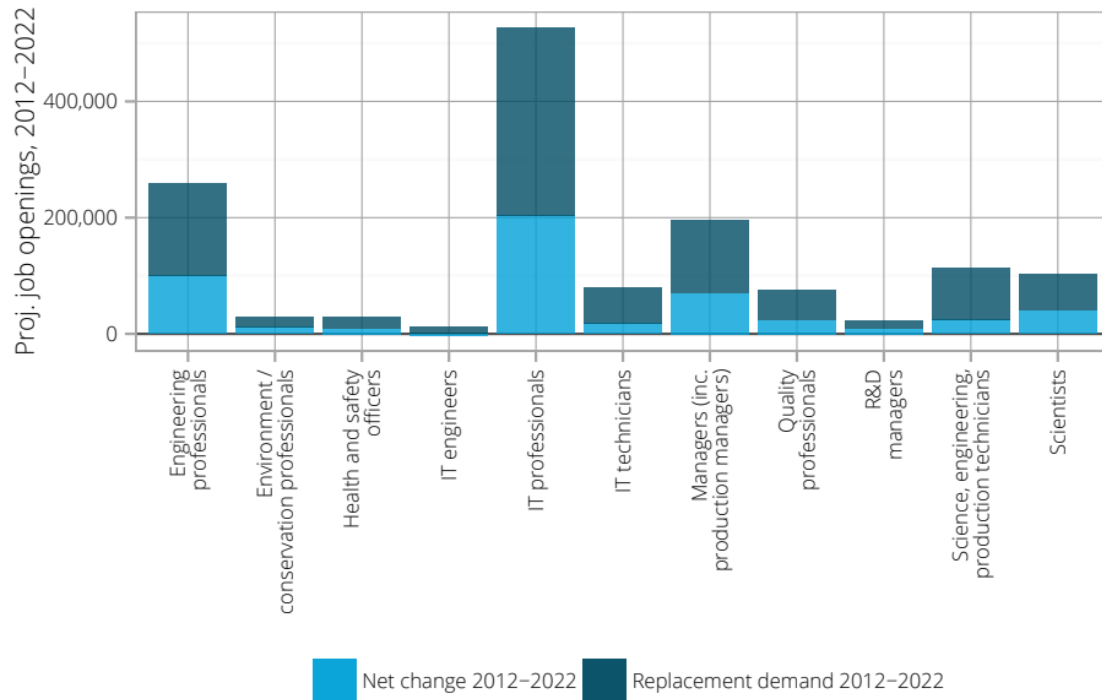
Senior subject specialist, computing & technology

National STEM Learning Centre and Network



Future STEM jobs

Figure 9 Projected job openings by STEM job family, 2012-2022



Source: Working Futures 2012-2022. Replacement demand arises from exits from the occupational

A comparison of historic and projected growth in the eight STEM occupation clusters with total job growth in Britain from 2003-2026



EMSI – focus on the demand for STEM jobs & skills in Britain (2018 data)

Post-Covid shift

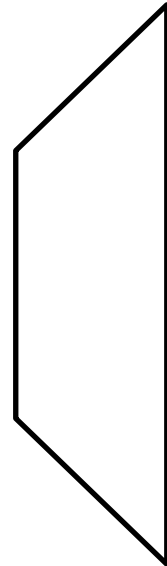
Exhibit 24

The mix of occupations may shift in all countries by 2030 in the post-COVID-19 scenario.

Estimated change in share of total employment, post-COVID-19 scenario, percentage points, 2018–30¹

Increased share Decreased share

Occupational category	Advanced						Emerging	
	France	Germany	Japan	Spain	United Kingdom	United States	China	India
Health aides, technicians, and care workers	1.6	1.9	1.4	1.5	1.4	2.2	2.7	1.0
Health professionals	0.8	0.7	0.9	1.0	0.7	1.2	1.3	0.5
Creatives and arts management	0.5	0.4	0.4	0.5	0.4	0.2	0.4	0.5
STEM professionals	1.0	1.2	1.0	0.9	1.0	1.0	1.2	0.8
Managers	0.7	0.6	0.4	0.7	0.9	0.6	0.5	0.6
Transportation services	0.3	0.6	0.1	0.3	0.1	0.3	0.9	0.4
Business and legal professionals	0.3	0.3	1.1	0.5	0.3	0.2	1.1	0.8
Community services	-0.3	-0.1	0.1	-0.1	-0.3	-0.2	0.8	0.2
Builders	-0.3	0.0	-0.2	-0.3	-0.3	-0.1	0.1	1.0
Educator and workforce training	0.0	0.4	-0.1	0.0	0.2	-0.1	0.4	0.7
Property maintenance	0.4	-0.2	-0.2	0.0	-0.2	0.1	0.5	-0.4
Food service	-0.6	-0.3	-1.1	-1.6	-0.7	-0.7	0.5	0.7
Customer service and sales	-0.9	-1.9	0.2	-0.5	-0.8	-1.1	1.3	0.3
Mechanical installation and repair	-0.2	-0.2	0.0	-0.2	-0.1	-0.2	-0.1	0.5
Office support	-2.1	-2.3	-2.2	-1.4	-2.2	-2.6	0.3	0.3
Production and warehousing work	-1.0	-1.0	-1.7	-0.9	-0.3	-0.7	-3.8	1.0
Agriculture	-0.2	-0.3	-0.3	-0.4	0.0	-0.1	-8.0	-8.9



Occupational category	Advanced						Emerging	
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STEM professionals	1.0	1.2	1.0	0.9	1.0	1.0	1.2	0.8

The future of work after COVID-19 - McKinsey Global Institute 2021

Diversity, inclusion, equity...



Why diversity in STEM is vital to cancer research

Category: [Research Feature](#)  March 3, 2022  [Cancer Research UK](#)  0 comments  5 m

Following the publication of the government's [R&D People & Culture Strategy](#), the House of Commons Science & Technology Committee launched an inquiry into underrepresentation in STEM. Cancer Research UK has an important role in fostering a diverse and inclusive research environment, and here we give a brief summary of our response to the consultation and explain why this matters for cancer research...



Routes to STEM employment – school and beyond

STEM GCSEs

Computer science

Triple Science

Maths...

Engineering, D&T

...the wide end of the funnel!

Russell Group – Informed Choices

Maths:

usually essential

- Further Mathematics
- Mathematics

may also be essential

- Physics

Computer science

usually essential

- Mathematics

may also be essential.

- Computing / Computer Science
- Digital technology
- Further Mathematics
- Physics

Chemistry:

usually essential

- Chemistry
- Mathematics

Possibly desired:

- Biology
- Environmental Science
- Further Mathematics
- Life and Health Sciences
- Physics

Physics

usually essential

- Mathematics
- Physics

may also be essential

- Further Mathematics

Mechanical Engineering

usually essential

- Mathematics
- Physics

may also be useful

- Chemistry
- Further Mathematics

Biology

usually essential

- Biology

A second science, such as

- Chemistry
- Computer Science
- Environmental Science
- Geography
- Mathematics
- Physics
- Psychology

Russell Group – Informed Choices

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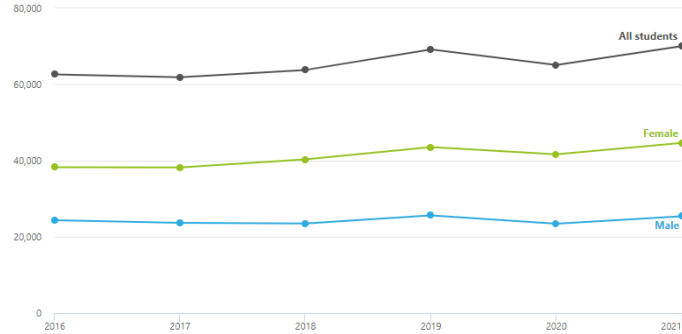
- Biology

A second science, such as

- Chemistry
- Computer Science
- Environmental Science
- Geography
- Mathematics
- Physics
- Psychology

Biology A-level (70k)

A-Level entries in biology, 2016-2021
All students, UK-wide
Number of entries

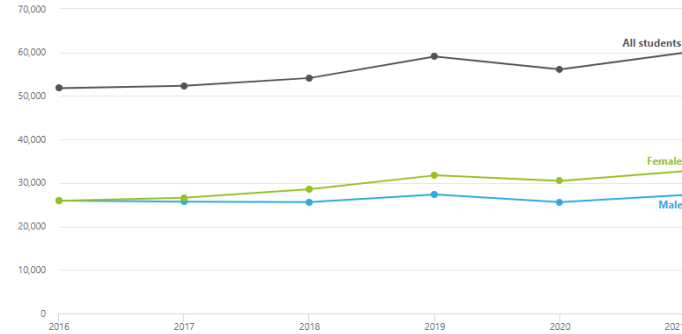


Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

fft education datalab

Chemistry A-level (60k)

A-Level entries in chemistry, 2016-2021
All students, UK-wide
Number of entries

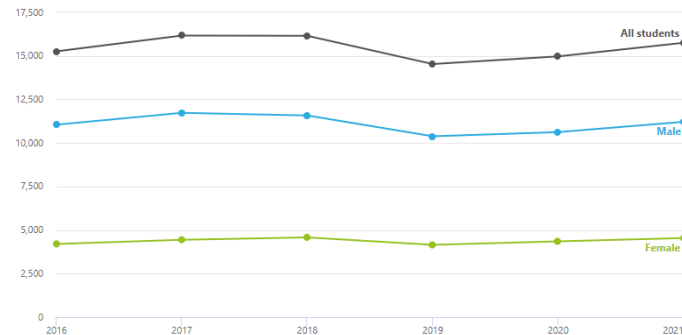


Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

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Further Maths A-level (16k)

A-Level entries in further mathematics, 2016-2021
All students, UK-wide
Number of entries

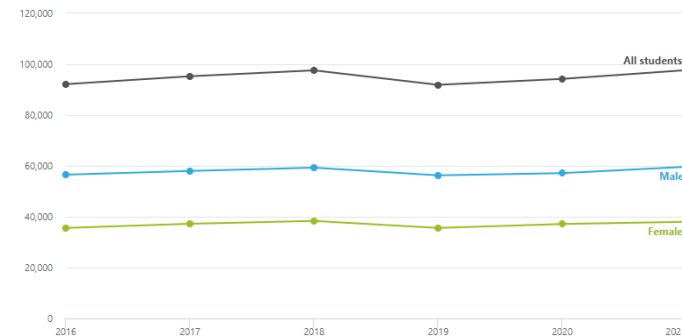


Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

fft education datalab

Maths A-level (98k)

A-Level entries in mathematics, 2016-2021
All students, UK-wide
Number of entries

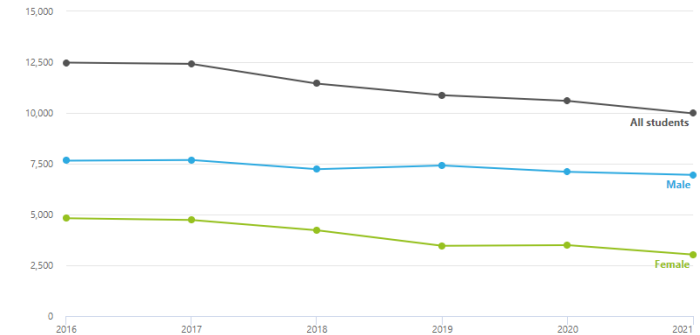


Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

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D&T A-level (10k)

A-Level entries in design and technology, 2016-2021
All students, UK-wide
Number of entries



Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

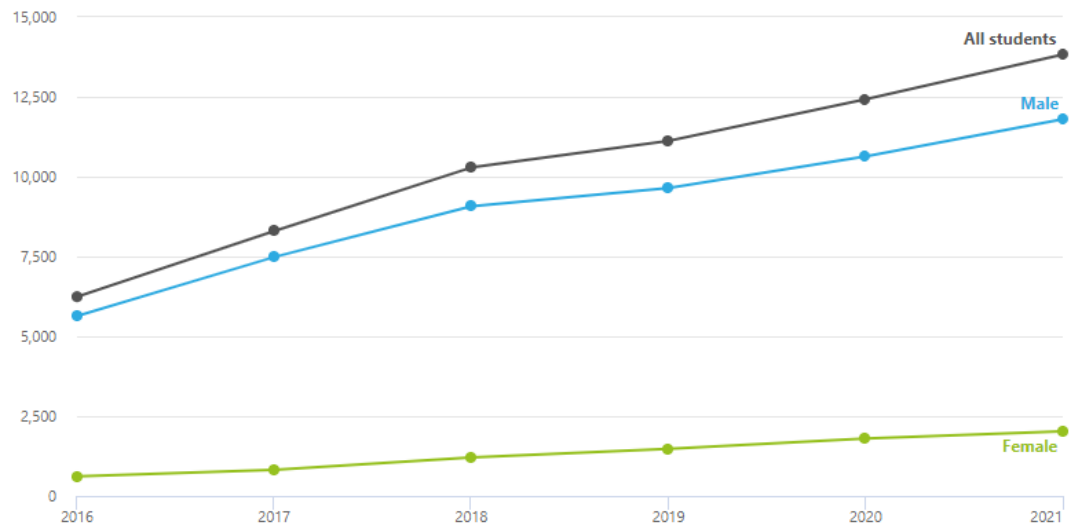
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FFT Education Datalab
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Computing / CS A-level (14k)

A-Level entries in computing, 2016-2021

All students, UK-wide
Number of entries



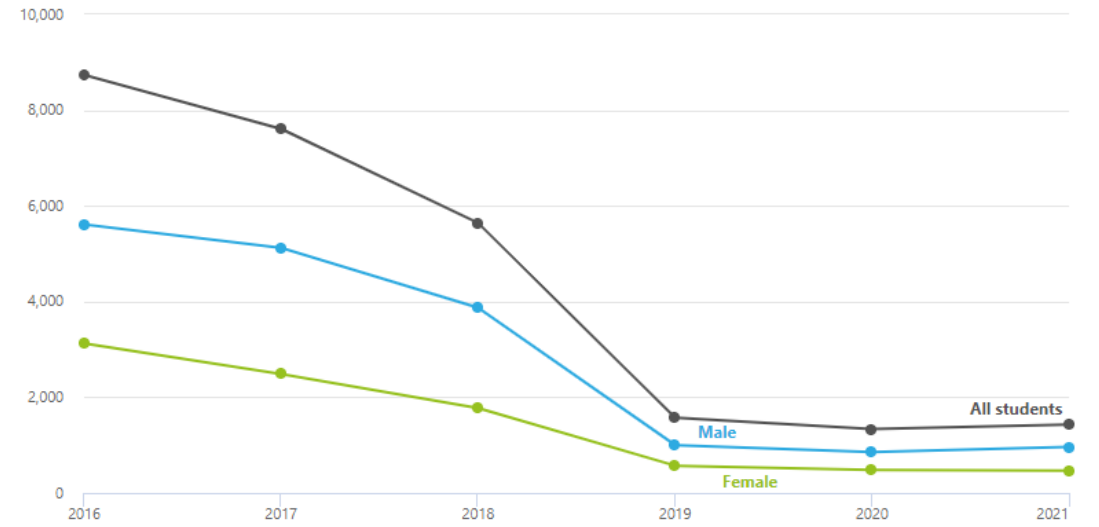
Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

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datalab

ICT A-level (1k)

A-Level entries in ICT, 2016-2021

All students, UK-wide
Number of entries



Source: FFT Education Datalab analysis of JCQ data
Project funded by the Nuffield Foundation

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Technical / vocational STEM pipeline

DfE reveals plan to scrap thousands of level 2 and below qualifications

Pressure mounts on Ofsted to limit grades by Baker Clause compliance

T Levels: 9 in 10 providers miss enrolment targets

Confused and frustrated: Most universities reject first cohort of T Level students

ETHNIC BREAKDOWN OF T LEVEL STUDENTS		Source: Individualised Learner Record (ILR) and School Census data June 2021		
ETHNIC GROUPINGS	EDUCATION AND CHILDCARE T LEVEL	DIGITAL PRODUCTION, DESIGN AND DEVELOPMENT T LEVEL	DESIGN, SURVEYING AND PLANNING FOR CONSTRUCTION T LEVEL	TOTAL STUDENTS
White English/ British/Irish or other white background	597 (88%)	309 (75.4%)	239 (86.9%)	1,145 (84%)
Not provided/ unknown	7 (1%)	10 (2.4%)	8 (2.9%)	25 (1.8%)
Black and other minority ethnic groups / mixed	74 (11%)	91 (22.2%)	28 (10.2%)	193 (14.2%)
Totals	678	410	275	1,363

Gender imbalance in STEM BTECs

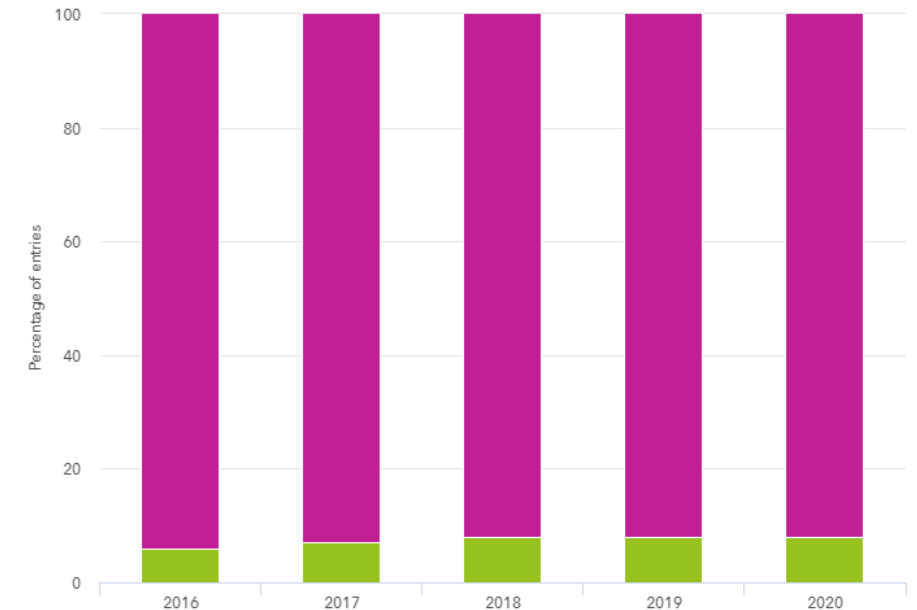
Gender balance in BTECs by subject, 2020

Male and Female students in England



Gender balance: Engineering studies, 2016-20

Male and female students in England



Notes
Source: FFT Education Datalab analysis of NPD data

Apprenticeships – a big gap

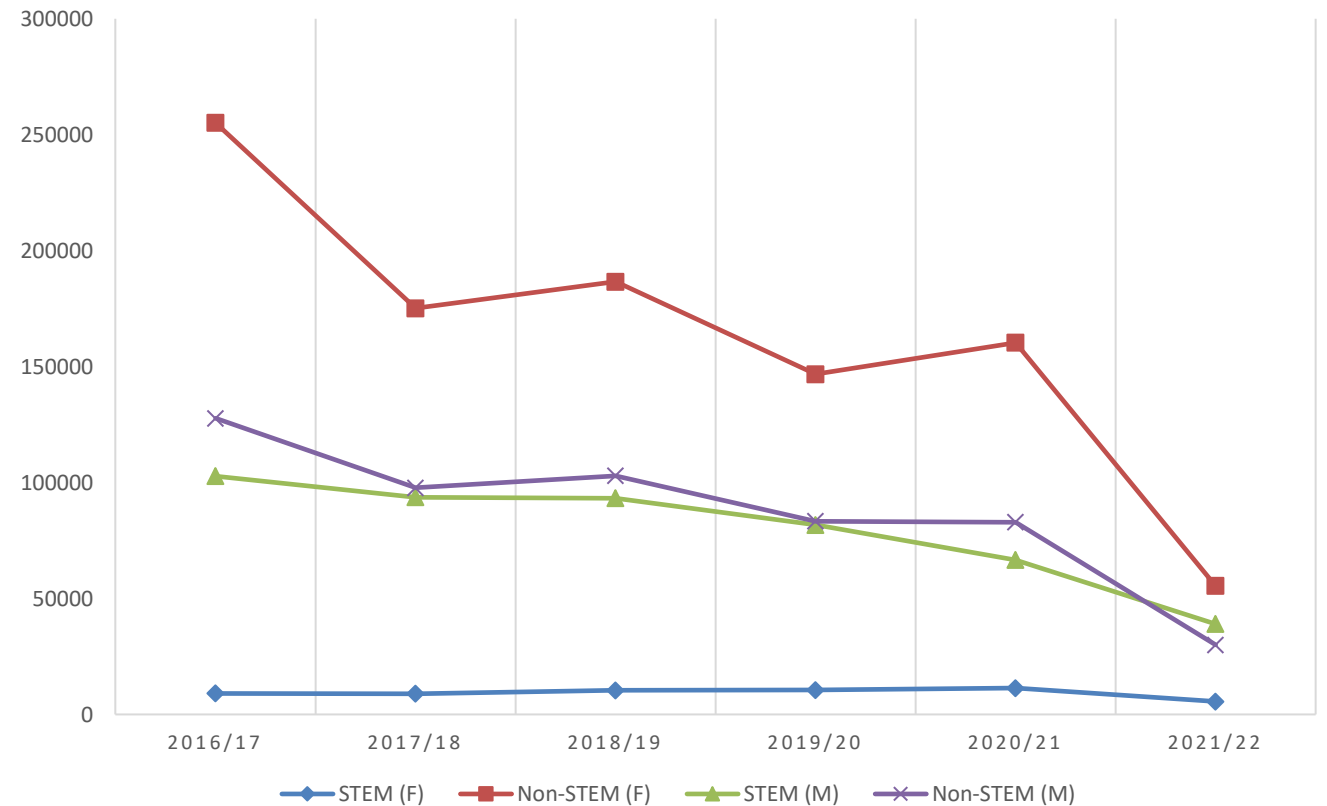
Are apprenticeships the answer to the UK's STEM skill shortage?

Business and digital were most popular apprenticeships of 2021

How apprenticeships are helping bridge the digital skills gap

Degree apprenticeships: meeting the needs of employers and apprentices

APPRENTICESHIP STARTS



STEMettes

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Gender Balance in Computing

Researching the best ways to encourage more women to study Computer Science.



CREATE NEW WORLDS

THIS IS ENGINEERING

MEET FELICIA. VR VISIONARY. AS A CHILD, SHE LOVED GAMING CONSOLES AND COMIC BOOKS. NOW, SHE WORKS FOR FACEBOOK, USING CUTTING-EDGE VIRTUAL REALITY AND AUGMENTED REALITY TECHNOLOGY TO CREATE NEW WAYS FOR PEOPLE TO CONNECT.

SEARCH 'THIS IS ENGINEERING'

PEOPLE LIKE me

A RESOURCE PACK FOR SCHOOLS

careers in... **The Space Sector**

WISE helps you to inspire girls to find great careers in science, technology and engineering

Supported by **UK SPACE AGENCY**

GAMES CAREERS WEEK

17TH JUNE TO 26TH JUNE

APPG on Diversity and Inclusion in STEM

Inquiry into Equity in the STEM Workforce

Final report

JULY 2021

BRITISH SCIENCE ASSOCIATION

The importance of equality, diversity and inclusion in physics

Why making physics a welcoming, supportive and fair place for everyone is at the core of the IOP's work

October 2021

iop.org **IOP** Institute of Physics



Ongoing efforts in EDI

Second-subject specialists

Recent data (2017 / 2019)

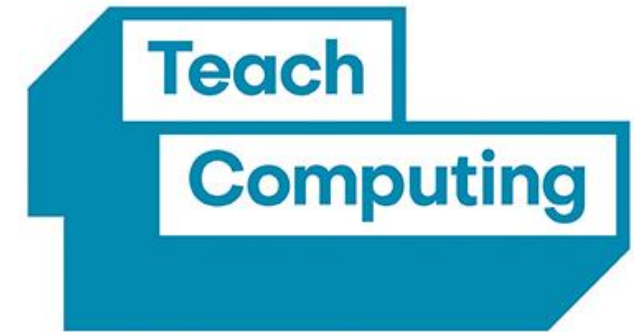
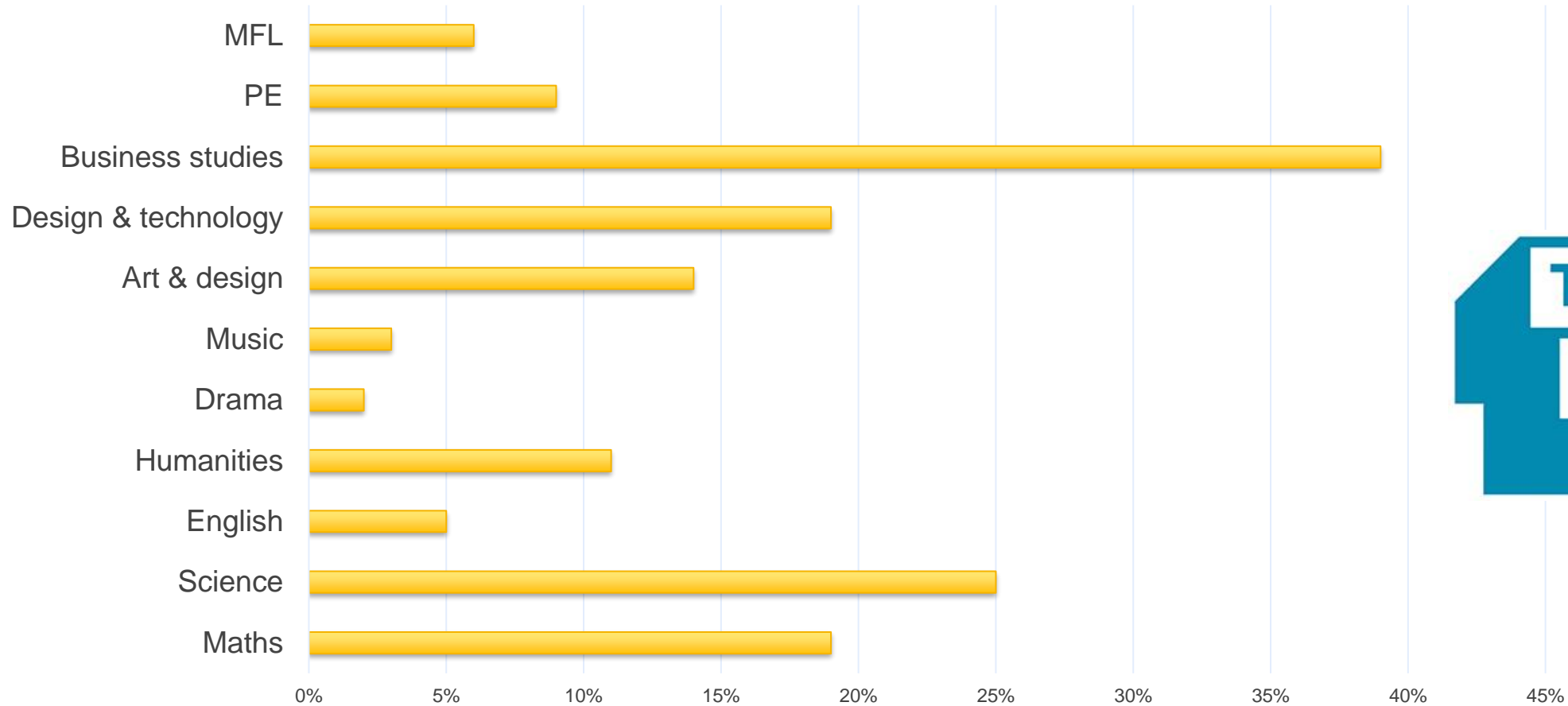
of teachers in state-funded secondary schools:

- ~64% of computing teachers
- ~50% of ICT teachers
- ~37% of physics teachers
- ~25% of chemistry teachers
- ~25% of history teachers
- ~19% of English teachers

did not have a relevant post A-Level qualification



Proportion of secondary hours taught by 'non-specialists' in computing (2015)



Proportion of hours taught in a typical week in November 2015 to pupils in years 7 to 13 by teachers without a relevant post A-level qualification by the subject(s) of the post A-level qualifications they hold.
'Specialist and non-specialist' teaching in England: Extent and impact on pupil outcomes Dec 2016

Questions?

Thank you for listening!

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