

## **Research Space**

Journal article

**Is the future pipeline of education technology developers in jeopardy?**

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## Is the future pipeline of education technology developers in jeopardy?

The Science, Technology, Engineering and Maths pipeline from school to Higher Education to industry is currently considered broken. Next generation education technology developers like any other technology led industry is dependent on STEM talent pipeline. It is currently estimated that 52,000 IT jobs are unfilled, and 94% of technology employers reporting skills shortage. Volume of vacancies growing each quarter. Estimated that R&D sector needs an additional 150,000 scientific researchers and technicians by 2030 to ensure economic growth and UK country development. In the long term will place a squeeze on education technology developers and technology educators' talent pool, as other sectors offer greater financial rewards and benefits to fulfil their skill shortages. In addition, UK equality act 2010, 2018 amendment requires education providers to ensure all technology adopted meets the accessibility regulations. It is known diverse teams provide fresh perspectives, greater innovations and inclusive designed solutions. COVID19 highlighted the digital divide between socioeconomic, town and country populations access to digital technology, that is rural and low socioeconomic disparity in access to technology and the internet. Therefore, the STEM needs more diverse STEM workforce to provide multiple perspectives, to address the education digital technology divide and reduce the digital skills gap of the future industry talent. Education needs more diverse STEM educators to inspire next generation STEM workforce in industry or education. For last two academic years in England STEM teacher training programmes have been filled, in fact maths and physics teaching training courses are less than half full. In addition, the current Baby Boomer generation who embraced STEM education inspired by the Space Race, and post-world war II renewal and regeneration are currently retiring. Thus creating an increasing vacuum of STEM vacancies in industry, public and education sectors, an ever-decreasing circle of STEM talent pipeline, figure 1.

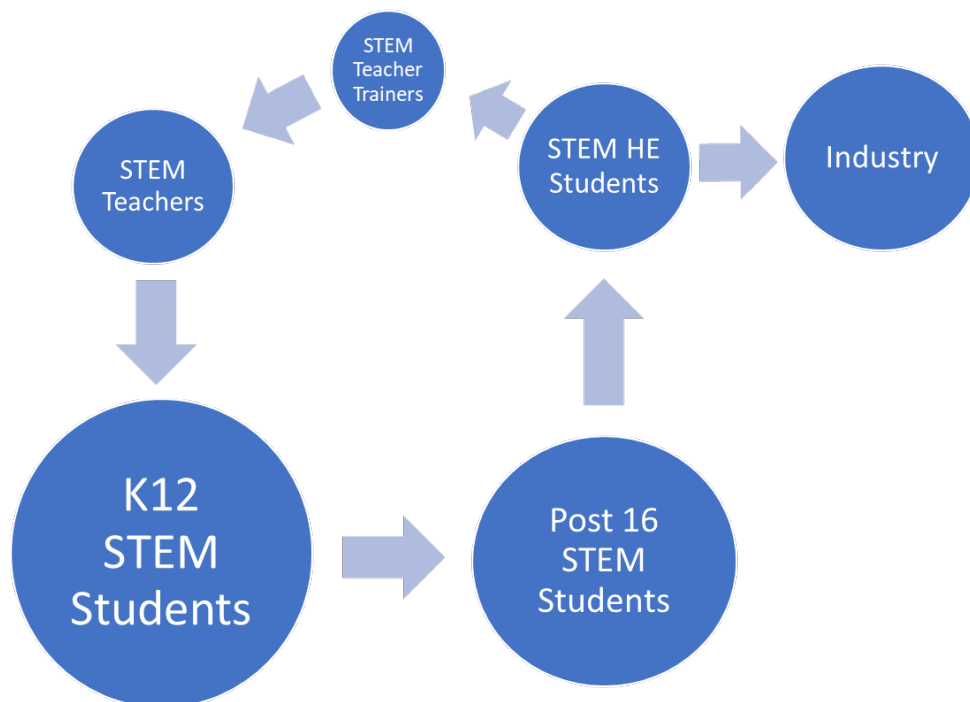


Figure 1: STEM Talent Circular Pipeline

It should be noted currently elected and civil service government who are developing STEM education and industry policy themselves only 10% have a STEM HE qualification. Therefore, one could argue there is disconnect between government and the realities of industry and education. Traditionally the majority of STEM pipeline to Higher Education is via STEM A'levels. Figure 2 and 3 highlight that current Gen Z population of both genders in the England are increasing not studying STEM A'levels, has declined since the COVID19.

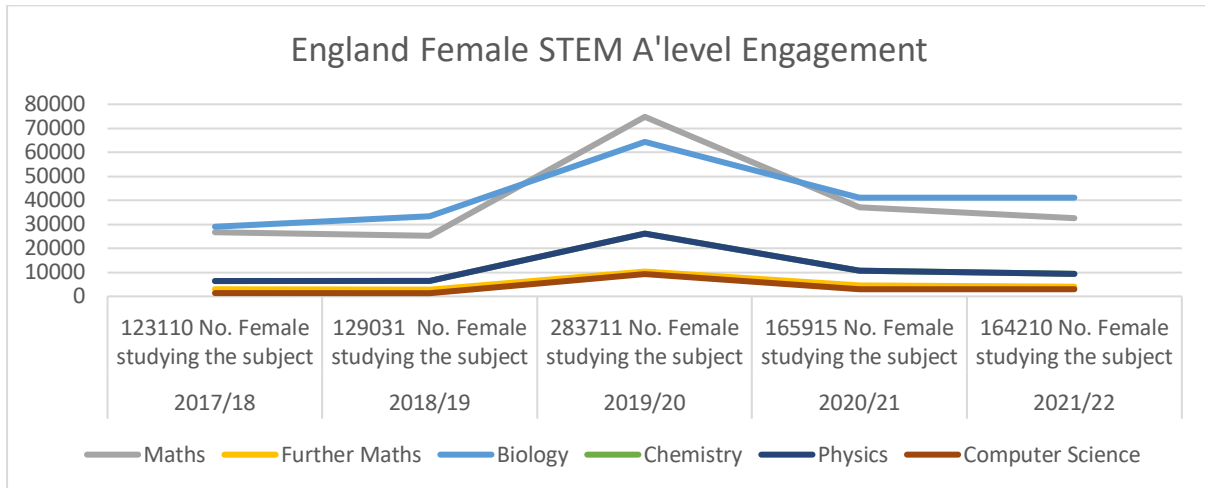


Figure 2: Graphical trend of number of female students who completed STEM A'levels in England

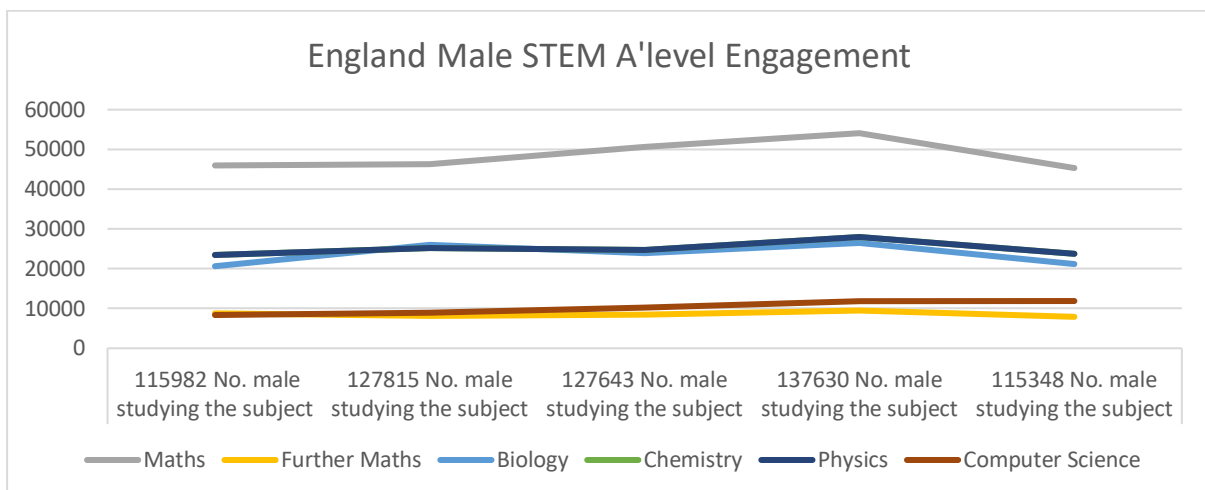


Figure 3: Graphical trend of male students who completed STEM A'levels in England

It was noted around the world the quality and volume of STEM education significantly reduced during COVID19 pandemic. Schools, educators, parents and students all struggled to provide meaningful practical STEM education learning online and at home. Further impacting the digital education divide that opened further during the pandemic. The STEM A'levels results would indicate COVID19 is casting a long shadow on STEM education in the England. Only Computer Science nationally in England having marginal increase in up take for both genders

The good news here in Kent and Medway, [Canterbury Christ Church University](#) has been actively engaged in providing meaningful contextualised STEM outreach learning over the last six years, including the pandemic. Canterbury Christ Church University hosts and operates [Southeast STEM Hub](#), [Kent and Medway Collaborative Outreach Programme \(KAMCOP\)](#), [Primary and Secondary Engineering](#) (sponsored by [Kent and Medway EDGE Hub](#) and Port of Dover) and teams from the

University's [School of Engineering, Technology and Design](#) and [School of Psychology and Life Sciences](#) and University school and colleges education outreach department, are proactively making a STEM difference. They are collectively delivering across Kent and Medway inclusive meaningful outreach activities. During 2022-23 the teams delivered inspiring STEM outreach activities to over 14,000 learners across Kent and Medway K-12 education provision. Meaningful STEM outreach at each key stage of the national curriculum has been shown to increase STEM talent pipeline to STEM higher education and industry. Figure 3 and 4 would concur the positive impact on STEM education in Kent and Medway, STEM A'levels engagement increasing overtime. Though COVID19 potentially has had minor impact on female students' uptake of A'levels Maths and Physics, but significantly less than the national English picture. It is an area for future focus for outreach activities in Kent and Medway, the potential applied Maths and Physics in technology, in particular education technology for all of society.

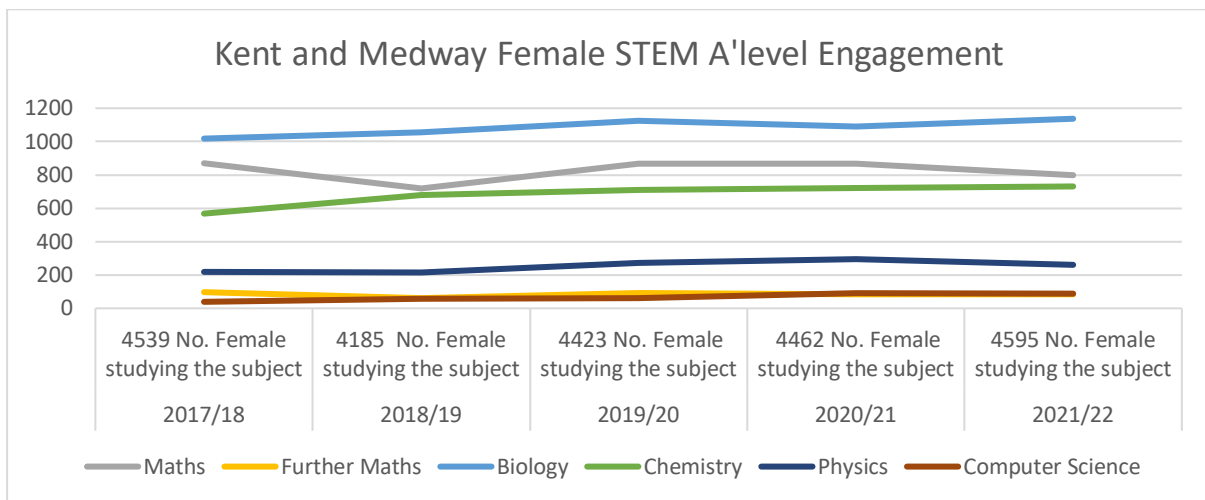


Figure 4: Graphical trend of female students who completed STEM A'levels in Kent and Medway

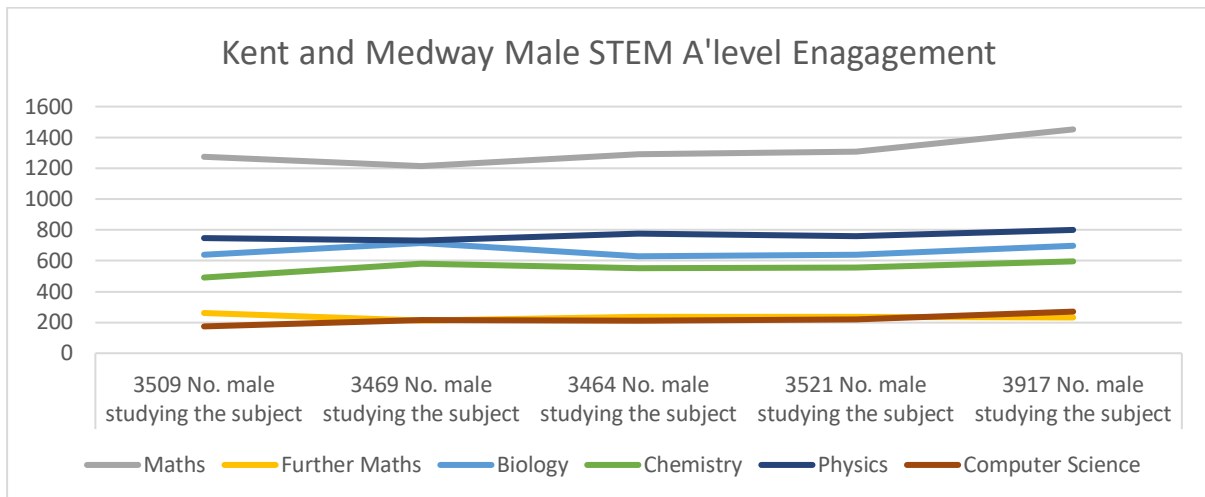
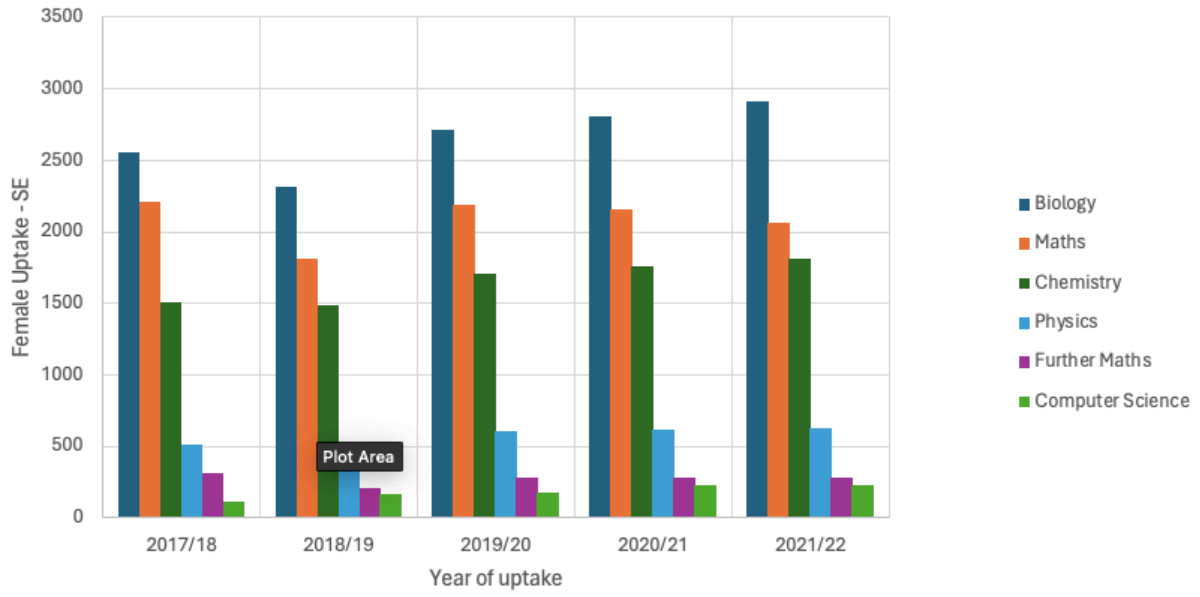


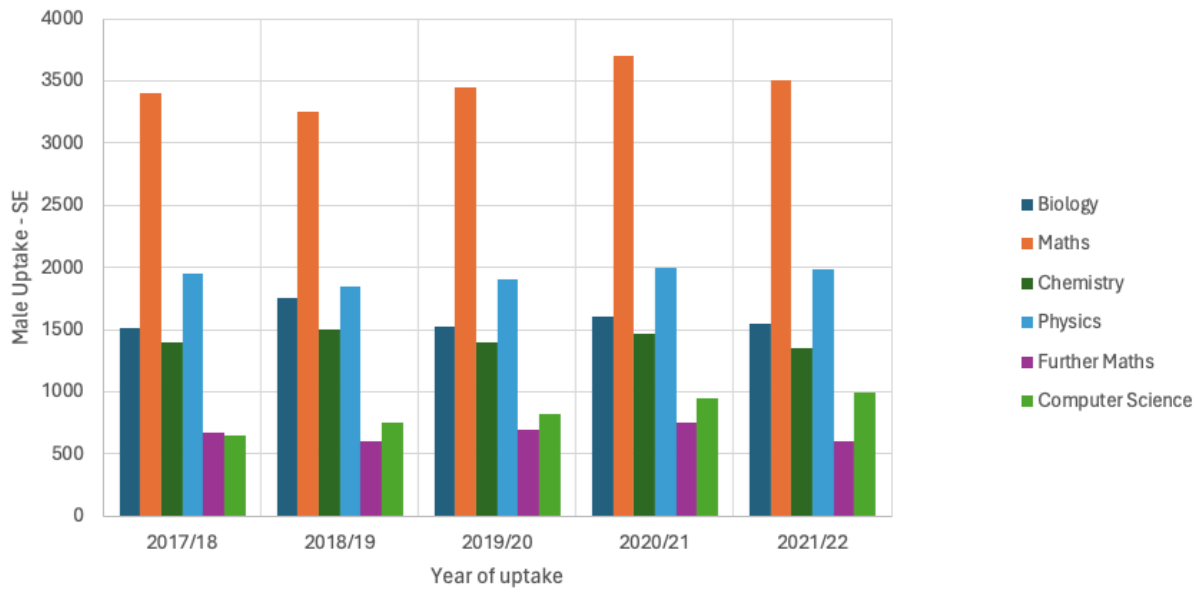
Figure 5: Graphical trend of male students who completed STEM A'levels in Kent and Medway

Alternative plots:

STEM A Levels - SE Female Uptake by year



STEM A Levels - SE Male Uptake by year



2017 A'level heat map

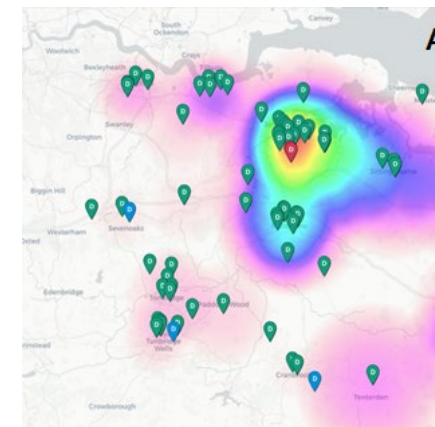
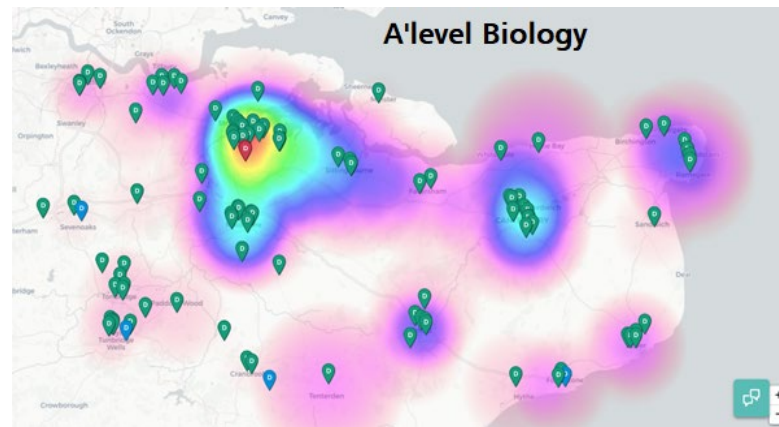
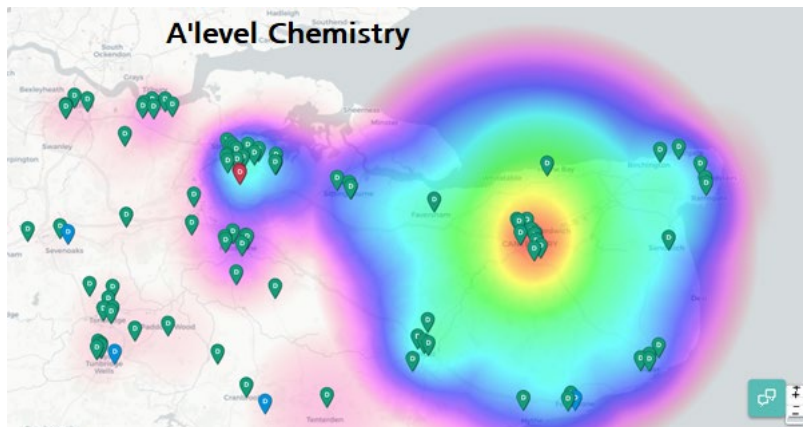
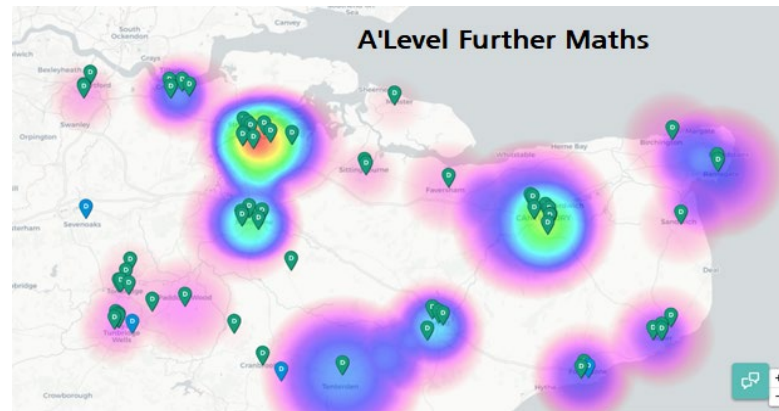
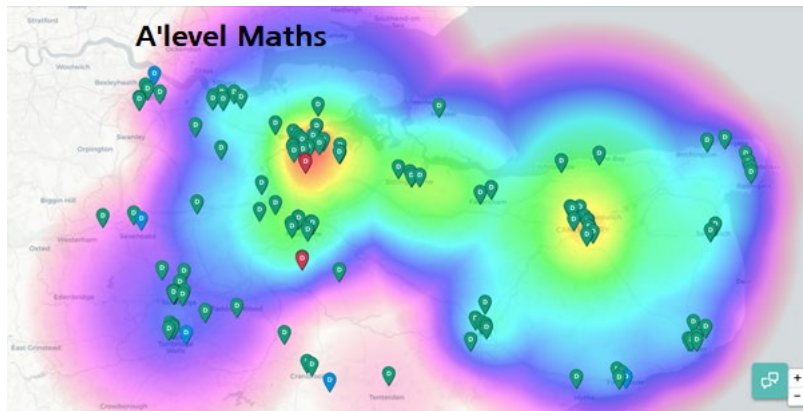


Image Source: Nortcliffe, A., Stallard, J., & Barley, R. (2019)