

## Executive Summary

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STEM Learning's Continuous Professional Development (CPD) programmes for science teachers supports their objective of promoting world-class education in Science, Technology, Engineering and Mathematics (STEM) subjects in the UK.

Teacher CPD has direct impacts on the teachers supported by STEM Learning activities, as well as indirect impacts on the pupils that they subsequently teach. As such, valuation of the impacts of science CPD must consider the social value created through both beneficiary groups.

The impact of STEM Learning Science CPD across different Key Stages were identified and valued. Best-practice valuation methodologies consistent with the government guidance on policy appraisal (HM Treasury, 2020a) were applied.

Pupil-related benefits were calculated on the basis of the expected wage premia for those pupils who increased their STEM attainment or took their STEM education further as a result of the CPD intervention. Values to wider society through the additional tax payments from these individuals were also calculated. Wage premia were calculated using a panel dataset allowing for estimation of separate wage premia at six time points across a person's career up until the age of 46.

Teacher-related benefits were calculated on the basis of improved teacher retention that results from effective CPD. The value of increased retention to society was valued through the reduced training costs that schools and government face as a result. Given that improved retention also means that individuals remain in a profession that is generally associated with higher wellbeing, this wellbeing boost from teachers remaining in the sector was also valued.

The overall **estimated value of the four sets of activities ranged from £51.9m to £213.8m** as set out in Table ES1.

The **majority of these benefits were estimated as being derived from pupil-related benefits**. The estimated additional future wages accruing to those pupils, whose attainment or uptake of STEM subjects increased as a result of the CPD, were estimated to be between £24.2m and £143.3m across the four sets of activities. The estimated additional taxes paid by these individuals were estimated to be from £16.4m to £67.4m across the four sets of activities.

**Benefits as a result of increased teacher retention were estimated to be a smaller proportion of total benefits**, ranging from less than £1m to £10.5m, with the majority of these representing the benefits from avoided training costs.

*Table ES1: Overall estimated benefits of Science CPD activities*

Activities	Pupil-related benefits		Teacher-related benefits		Total
	Direct	Indirect	Direct	Indirect	
KS2	£25.0m	£16.4m	£1.4m	£9.1m	£51.9m
KS4	£26.9m	£57.2m	£1.4m	£9.1m	£94.6m
Triple Science	£24.2m	£56.0m	£0.1m	£0.6m	£80.9m
KS5 Progression	£143.3m	£67.4m	£0.4m	£2.7m	£213.8m

Estimation of a total cost for these activities was out of scope of this research but an initial assessment of core costs (£19 million) suggests that the activities provided a significant positive return to society.

The estimates made in this research represent a robust and conservative estimate of the benefits of these four areas of CPD activity. The figures are likely to understate the full value of such activities because i) the wage premia are only calculated until 46 years of age (whereas several papers estimate them until age 67) and ii) a number of additional channels through which STEM Learning’s Science CPD activities generate value were not assessed due to a lack of adequate data. In particular, the impact of such CPD activities on improving the grades of those students who were already likely to achieve the relevant standard (for example, the Science EBacc) was not assessed.

Further research should look to extend the range of benefits calculated by assessing additional benefits to a wider range of pupils. Estimation of teacher-related benefits could be strengthened through randomised control trials to examine the impact of CPD on teacher wellbeing and retention across different Key Stages.