

2026 PhD Projects

Project title	Emerging quantitative literacies in school – where and for whom?
Principal supervisor	Dr Vinay Kathotia
Second supervisor	Prof Cathy Smith
Discipline	Mathematics education
Research area /keywords	Mathematics education, cross-curricular mathematics, data literacy, real-world mathematics, gender
Suitable for	Full time applicants, Part time applicants

Project background and description

Education policy in England may be moving towards more integration of mathematical and data skills in other subjects. For example, following a review of science, business, computing, economics, and geography A-levels (Nuffield Foundation, 2012), their post-2015 specifications strengthened and made explicit the mathematical and statistical content, while future curriculum projects propose a focus on quantitative literacies and domain-specific mathematical competences (Royal Society, 2023). Mathematics can provoke starkly contrasting attitudes among school students, which are influenced by perceived attainment, career utility and gender (Noyes & Adkins, 2016). There are arguments that increasing the relevance of mathematics to students' lived experience or other areas of study will develop students' mathematical skills and encourage them to study and use mathematics (Smith & Golding, 2018), thus reducing the numeracy gap (Borgonovi et al., 2021).

In this project, we will consider one or both of the following strands of work:

- (i) use survey and interview techniques to research the experiences and attitudes of students using mathematical and data literacy (Smith et al., 2023) within other subjects, for example in the new mathematically-rich A levels, and/or Core Mathematics.

- (ii) work with a group of teachers across a handful of schools and colleges, using interviews, focus groups and design experiments (Cobb et al., 2003) to identify and research availability of curricular space and time for opportunities for mathematical and data literacy inside or outside the mathematical classroom.

Students will be expected to review relevant literature, construct research instruments, contact schools, and develop and apply qualitative analytic methods to the data.

Background reading/references

- Borgonovi, F., Choi, A., & Paccagnella, M. (2021). The evolution of gender gaps in numeracy and literacy between childhood and young adulthood. *Economics of Education Review*, 82.
- Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Design Experiments in Educational Research. *Educational Researcher*, 32(1), 9–13.
- Noyes, A., & Adkins, M. (2016). Studying advanced mathematics in England: Findings from a survey of student choices and attitudes. *Research in Mathematics Education*, 18(3), 231–248.
- Nuffield Foundation. (2012). Mathematics in A level assessments. Nuffield Foundation.
- Royal Society. (2023). A new approach to mathematics and data education.
- Smith, C., & Golding, J. (2018). Schools' Strategies for Promoting Girls' Participation in Mathematics. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.), *Proceedings Of the 42nd Conference of the International Group for the Psychology of Mathematics Education (Vol 4)* Umeå, Sweden. (pp. 211–218).
- Smith C., Kathotia V., Ward-Penny R., Howson O., & Wermelinger M. (2023). Mathematical and Data Literacy: Competencies and curriculum implications at the intersection of mathematics, data science, statistics and computing. The Open University.