**324**

# Discourses of access to elite mathematics higher education in England

Beth Hocking

Imperial College, London, United Kingdom

**Research Domains**

Student Access and Experience (SAE)

**Abstract**

This research focuses on discourses of access to elite mathematics higher education in England. It builds on widening participation research which seeks to critique the persistently inequitable patterns of participation in higher education, particularly on high tariff courses (Mountford-Zimdars and Moore, 2020). Access is characterised as being able to participate within a fair and open admissions system (Harrison and Waller, 2017). Focusing on mathematics, the study follows on from research which found that STEM subjects, being cumulative in nature, have more rigid entry requirements and are therefore less responsive to widening participation aims (Kandiko Howson, Cohen and Viola, 2022). This research seeks to scrutinise, critique and challenge the contemporary discourses of access to elite mathematics higher education, with emphasis on admissions tests and interrelated ability discourses. The aim being to interrogate how power, knowledge and resistance operate through discourses in elite mathematics and the effect these have on individuals.

**Full paper**

Background and approach

Elite maths higher education (defined in this study as the four mathematics courses that require admissions tests in England) has not been a specific focus of research. This section of higher education deserves scrutiny because women, disadvantaged students and black students are underrepresented in mathematics higher education (Dearden, Britton and Waltmann, 2021; HESA, 2022). This inequity is heightened by the prestige associated with elite institutions and the high lifetime earnings of mathematics graduates compared to other subjects (Belfield et al., 2018). Access to elite mathematics higher education is restricted by high entry tariffs and additional entry tests (Darlington, 2015) which perform a gatekeeping function. Innate ability discourses have been associated with mathematics and perceived as having inequitable effects on higher education participation (Archer et al., 2023). This study draws together the discourses of widening participation and those of elite mathematics to examine how they interrelate, govern and are resisted. Practically, this understanding can be used to inform policy and practice in mathematics education, admissions and outreach.

## Methodology

The study uses a qualitative approach based in a constructionist and post-structural framework. The design of the study reflects a Foucauldian understanding of discourse as social practices that constitute the social reality and govern individuals (Khan and MacEachen, 2021). The study includes group and individual interviews with 45 elite mathematics higher education stakeholders. Unlike previous interview studies, which have focused primarily on admissions staff and tutors, this study seeks to gather views from a range of stakeholders in order to examine how the discourses relied upon interact, shape action and constrain the freedom of individuals. Interviews have been undertaken with maths students and lecturers at the selected institutions, as well as school maths teachers and stakeholders in outreach and the third sector. The aim of the interviews is to gather a range of discursive data from different stakeholder groups around the subject of access to elite maths HE, including explanations of the patterns of participation and admissions policies, with particular regard to admissions tests.

Analysis of interview transcriptions focuses on discourse themes emerging from the literature which may include: meritocracy, competition, excellence, ability, potential, acceleration, giftedness. In line with the discourse analysis approach, attention is paid to how problems are framed and how certain discourses are accepted as pre-existing truths. Similarly, sources of discourse tension are explored both within and between the various discourses. Through this process, the study aims to critique and interrogate discourses of access to elite maths higher education with a view to developing a detailed understanding of how power and resistance operate through the discourses and the effect that these have on individuals.

## Findings

Data collection and analysis is ongoing and initial findings relate to interviews with 24 students. These suggest that discourses of prestige and league table rankings are influential in shaping students' initial university aspirations. Many students draw on a discourse of 'unreasonable difficulty' to explain why they alter their aspirations to avoid a particular admissions test. Some students draw on resistant discourses of 'opting-out' in response to admissions systems that they see as 'cruel', 'stressful' and 'a gamble'. Discourses of cost/benefit are used to explain why they are better off having opted out, rather than spending time to achieve an offer which is later lost.

Students all reject or question innate ability discourses but at the same time recognise that they found mathematics easier than most of their peers throughout school. They unanimously draw on discourses of 'practice' to describe how they develop as 'problem-solving' mathematicians. Some students describe collecting mathematical 'tricks' through solving problems, which they draw on in problem- solving, both in mathematics competitions and admissions tests.

Students describe themselves as being 'good enough' to do the admissions tests but see time as their enemy. Students refer to time constraints and a 'trade-off' between their A Levels and the admissions tests. Investing time in the admissions tests is characterised by some as a 'risk' due to the negative impact on their non-mathematics A Level performances. Students sometimes describe teachers as blocking their mathematics progress by sequencing work too slowly and not letting them 'go ahead'. Many are critical of 'school maths' which is 'routine' and 'repetitive', and contrast this with problem-solving, which they see as 'real' or university

mathematics. A Level work is something they need to get on with, in order to 'create time' to practice the admissions tests.

**References**


Archer, L., DeWitt, J., Godec, S., Henderson, M., Holmegaard, H., Liu, Q., MacLoed, E., Mendick, H., Moote, J. and Watson, E. (2023) ASPIRES3 Summary Report: Mathematics. London, UCL.

Belfield, C. et al. (2018) The relative labour market returns to different degrees. Department for Education.

Darlington, E. (2015) 'What benefits could extension papers and admissions tests have for university mathematics applicants?', Teaching Mathematics and its Applications, 34(4), pp. 179–193. Available at: https://doi.org/10.1093/teamat/hrv003.

Dearden, L., Britton, J. and Waltmann, B. (2021) The returns to undergraduate degrees by socio-economic group and ethnicity. The IFS. Available at: https://doi.org/10.1920/re.ifs.2021.0186.

Khan, T.H. and MacEachen, E. (2021) 'Foucauldian Discourse Analysis: Moving Beyond a Social Constructionist Analytic', International Journal of Qualitative Methods, 20, p. 16094069211018009. Available at: https://doi.org/10.1177/16094069211018009.

Harrison, N. and Waller, R. (2017) 'Success and Impact in Widening Participation Policy: What Works and How Do We Know?', Higher Education Policy, 30(2), pp. 141–160. Available at: https://doi.org/10.1057/s41307-016-0020-x.

HESA (2022) What do HE students study?, HESA. Available at: https://www.hesa.ac.uk/data-and-analysis/students/what-study#characteristics (Accessed: 7 March 2023).

Kandiko Howson, C., Cohen, E. and Viola, J.K. (2022) 'Inertia in elite STEM widening participation: the use of contextual data in admissions', British Journal of Sociology of Education, 43(6), pp. 950–969. Available at: https://doi.org/10.1080/01425692.2022.2085660.

Mountford-Zimdars, A. and Moore, J. (2020) 'Identifying merit and potential beyond grades: opportunities and challenges in using contextual data in undergraduate admissions at nine highly selective English universities', Oxford Review of Education, 46(6), pp. 752–769. Available at: https://doi.org/10.1080/03054985.2020.1785413.