

Numeracy for Q-Step

Assessing the numerical ability of undergraduate students in order to better support them



Q - Step

**A step-change in
quantitative social
science skills**

Funded by the
Nuffield Foundation,
ESRC and HEFCE

About Q-Step

Q-Step is a £19.5 million programme designed to promote a step-change in quantitative social science training. Over a six-year period from 2013, fifteen universities across the UK are delivering specialist undergraduate programmes, including new courses, work placements and pathways to postgraduate study.

Q-Step was developed as a strategic response to the shortage of quantitatively-skilled social science graduates. It is funded by the Nuffield Foundation, the Economic and Social Research Council (ESRC) and the Higher Education Funding Council for England (now the Office for Students). For more information go to www.nuffieldfoundation.org/q-step

About National Numeracy

National Numeracy is an independent charity established in 2012 to help raise low levels of numeracy among both adults and children and to promote the importance of everyday maths skills. We aim to challenge negative attitudes, influence public policy and offer practical ways of helping adults and children improve their numeracy - in the community, the workplace and formal education.

Our goal is to enable everyone across the UK to be confident and competent in using numbers and data, to be able to make good decisions in their daily life and at work. For more information go to: www.nationalnumeracy.org.uk

About the Nuffield Foundation

The Nuffield Foundation is an independent charitable trust that funds research and student programmes to advance social well-being across the UK. We want to improve people's lives, and their ability to participate in society, by understanding the social and economic factors that affect their chances in life.

The research we fund aims to improve the design and operation of social policy, particularly in Education, Welfare, and Justice. Our student programmes enable young people to develop their skills and confidence in quantitative and scientific methods.

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28 Bedford Square, London WC1B 3JS
Registered charity 206601

T: +44 (0)20 7631 0566
E: info@nuffieldfoundation.org

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Introduction

As part of the Nuffield Foundation's investment in Q-Step, National Numeracy was commissioned to work with nine Q-Step Centres and Affiliates to develop an initiative to measure the numerical ability of students on Q-Step programmes. This briefing note provides information relating to this exploratory project.

Background and purpose

1. This project built on concerns about the numerical capabilities and expectations of young people entering and graduating from UK higher universities, highlighted in reports from the Higher Education Academy (HEA)¹ and the Organisation for Economic Cooperation and Development (OECD)². The HEA report highlighted the mismatch between the level of numerical skills students thought they might require at university and the expectations of higher education institutions. The OECD report drew attention to the comparatively low levels of numeracy amongst UK undergraduates, graduates and adults generally.
2. The project's premise was that it is essential to assess numerical ability to understand where particular gaps might be and to determine what sort of support might be required.
3. National Numeracy worked alongside nine [Q-Step Centres and Affiliates](#) across the UK to investigate different approaches to assessing students' numerical ability.
4. The assessment method used in the project was a new version of National Numeracy's online [Challenge tool](#). The Challenge was originally developed in 2014 as a website which any adult could use to assess and improve their everyday maths skills. It is based around National Numeracy's Essentials of Numeracy model. The aim of the Essentials model was to map out the aspects of mathematics which are recurrent and essential in daily life and the workplace, and the attitudes which are needed to use these with confidence.
5. The project set out to explore different approaches to engaging students to use the Challenge tool and to develop an attitudinal measure to support our understanding of 'maths anxiety' amongst Q-Step students.
6. The project was a new development for Q-Step Centres and Affiliates. National Numeracy worked with universities that could accommodate the trial into their course design and / or encourage students to complete the Challenge in their own time.
7. The project was not set up as a rigorous academic study but rather a ground-clearing practical exercise which was both exploratory and quite opportunistic in nature. The intention was to assess the usefulness of the Challenge tool, identify barriers to its use and generate ideas about future adaptation and / or more structured applications.

¹ <https://www.heacademy.ac.uk/knowledge-hub/mathematical-transitions-report-mathematical-and-statistical-needs-students>

² <http://www.oecd.org/skills/piaac/Country%20note%20-%20United%20Kingdom.pdf>;
<https://www.oecd.org/unitedkingdom/building-skills-for-all-review-of-england.pdf>

Notes on the project's methods of implementation

8. Nine Q-Step Centres and Affiliates participated in the project: University of Bristol; City, University of London; University of Edinburgh; University of Essex; University of Exeter; University of Glasgow; University of Manchester; Manchester Metropolitan University; and University of Warwick.
9. The participating universities adopted different methods to engage students with the Challenge tool. Some institutions took a promotional approach, advertising the tool and highlighting the possible benefits to students whilst allowing them the freedom to decide whether or when to use the tool. Meanwhile others took a scheduled approach, which involved setting aside class time to proactively facilitate student participation. In some instances, participation was considered mandatory.
10. The various participating institutions also took different approaches to timing. Some asked students to engage with the Challenge at the start of the first year of study, others selected a point prior to an assessment requiring students to use quantitative skills, and some opted for the final year of study to link the tool to career planning.

Notes on issues faced

11. The project was often the sole responsibility of one member of staff within the participating institution. As such, it was sometimes difficult to engage other members of staff to encourage their students to use the tool.
12. The project took place in a relatively compressed timeframe and the participating students were often recruited on an opportunistic basis. This means that the initial findings from the project need to be treated as indicative rather than definitive.
13. Both of the issues above contributed to limiting the number of participating students. In total, 740 students engaged with the process at some level, with 483 of these completing the skills assessment in full.

The project's main findings

14. Only 26% of students that completed the Challenge assessment demonstrated that they had the [Essentials of Numeracy](#) – the numerical skills and understanding identified as generally necessary for daily life and work. Or in other words the functional equivalent of a 'C/4' at GCSE.
15. After the initial assessment, 71% of students who then visited the learning resources provided through the project and reassessed subsequently improved on their original score. 65% of participants indicated that their main reason for engaging with the Challenge was to help with their undergraduate course. 18% indicated that their reason for participation was to help with career preparation. 14% indicated that their reason was to help them manage daily life. 3% gave other reasons, of which half were responding to their tutor's request that they participate.
16. The reasons for participating, as cited by students, varied across the different years of study with the following pattern being evident:

- Of the first year students surveyed, a higher proportion cited 'managing day-to-day university life' than did so in other year groups;
- The proportion citing 'to help me with my course' was highest in the second year and was also higher in the first year than in the students' third and fourth years;
- 'Preparing for the world of work' and 'helping with their course' were of equal importance to third year students;
- 'Preparing for the world of work' was chosen proportionally more often by those in their third and fourth years than by those in lower years, with the world of work being the most common reason chosen by fourth year students.

17. The universities opting for the mandatory or scheduled approach, perhaps predictably, saw the highest engagement and completion rates.

Conclusions

18. Notable proportions of undergraduate students do not have the numeracy skills required to fully understand their course and in some cases this might also compromise their employability, especially in relation to certain graduate careers. The study shows that in many cases numeracy scores can be improved upon with additional support or by students having access to good learning resources.
19. In order to better support them it would be useful for universities to be more aware of students' numerical abilities. More particularly, this would help universities to understand where any gaps in student skills and knowledge lie prior to embarking on a degree where data and numbers may be central to successful study.
20. Many students might theoretically understand the value of assessing their own numerical ability, but they won't necessarily take action to do this or to engage with numeracy unless it is scheduled, possibly mandatory and / or assessed and valued.

Further action arising

21. National Numeracy will continue to work with the Nuffield Foundation to explore feasible models of embedding numeracy benchmarking and support into degree programmes.
22. National Numeracy will continue to work with the Nuffield Foundation to encourage increased use of the Challenge tool so that as many students as possible check their numeracy level and they and their institution can take appropriate and informed action thereafter.
23. With a view to increasing the number of students that leave university with the Essentials of Numeracy, National Numeracy will continue to promote use of the Challenge tool as a means of assessing numerical ability and identifying potential areas for development and support. This includes promotion beyond the Q-Step network of institutions and also pre-entry to university.