Encouraging girls' participation in advanced mathematics

With no attainment gap between girls and boys at GCSE, why don't as many girls as boys choose to study it post-16? Research tells us there are five main factors and suggests useful strategies to encourage girls to see that post-16 mathematics is for them.

Prior (relative) attainment

Students are far more likely to continue with mathematics if the grade they get in their GCSE is their highest grade overall. Both girls and boys do about the same in GCSE mathematics but girls do better in GCSEs overall. This has a disproportionate impact on girls as they are less likely to have achieved their highest GCSE grade in mathematics.

We need to be careful about presenting participation in mathematics as only for very high-attaining students because girls' choices already conform to this pattern.

Both boys and girls who have other viable options need support to get over initial problems and continue in mathematics.

Enjoyment

Whether or not they enjoy a subject has been shown to be more important to girls than boys when selecting their post-16 choices.

Girls report enjoying mathematics slightly less than boys do.

Negotiation and comparison of different perspectives is reported as increasing lesson enjoyment for girls, along with teaching that emphasises multiple strategies for solving problems.

Enjoyment is not an isolated factor. It is important to consider how it interacts with other factors such as those concerning motivations, encouragement and perceived competence.

Perceived competence

Girls consistently under-rate their performance in mathematics. This reduces girls' participation post-16 as girls are not experiencing the motivating effect of accurately judging their own performances.

Girls' low self-concept in mathematics needs to be addressed by the teacher both with individuals in the classroom, and by providing accurate messages about girls' and boys' similar abilities in mathematics.

Advice and encouragement is effective in mediating the effect of girls' lower self-concept on participation.

Interest

Girls are more likely than boys to give interest as a reason for STEM related subject choices. Those who do choose mathematics are more inclined to report that they do so out of interest or an appreciation of its intrinsic value. More girls than boys find mathematics uninteresting.

Interventions to interest girls in mathematics should start in the early years of secondary school.

Provide examples and advice in mathematics that relate to its relationship with subjects such as Biology, Chemistry, Business Studies, Economics, Geography, Psychology and Sociology.

Utility

The perceived utility of mathematics is one of the key reasons for students choosing to study it. Conversely, students who do not consider mathematics useful are less likely to study it, and this is accentuated for girls.

Showing students the many ways in which mathematics could be valuable to them is a way to raise both interest and perceptions of utility.

Interventions should address families as well as students, and provide examples, information and local contacts that help them feel knowledgeable and comfortable with steps to a STEM career.