

**1930****Researching gender and mathematics in changing times/cultures**

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Submission type

Symposium

Abstract

Research in mathematics education increasingly recognises binary notions of gender – male/female – as problematic and unethical categories of analysis (Forgasz, 2021; Rands, 2012). Projecting onto children/adolescents two, often oppositional, constructs, binary gender renders invisible an array of experiences that exceed, intermingle, or complexify the categories of boy and girl. When educational researchers approach gender as a fixed background variable that influences learning outcomes (e.g. mathematics attainment), they overlook opportunities to understand gender as a dynamic variable that can fluctuate, and, indeed, respond to pedagogic practice in its own right. Young people's understanding of gender has significantly changed in recent years and we need to know more about how this affects and is affected by their relationships with mathematics and other STEM subjects. Given the importance of finding new ways to explore the changing relations between gender and mathematics in today's world, this symposium explores the methodological possibilities opened up by an embrace of non-binary gender in mathematics education research.

Paper 1 - Investigating locality and intersectionality in research on gender and students' socio-emotional relationships with school mathematics: a systematic review

[Laura Black](#), [Kate O'Brien](#), [Shunqi Zhang](#) – University of Manchester

We report on a systematic review of 120 recent journal articles that address the connections between gender and students' socio-emotional relationships with mathematics in compulsory schooling. Responding to Leyva's (2017) observations about the habits of analysis commonly deployed in quantitative and qualitative research on mathematics and gender, we analyse how gender is conceptualised and operationalised in recent literature and focus in particular on what intersectionality (Nash, 2017) and locality (i.e. specific cultural contexts, classroom dynamics, youth cultures) mean inside a variety of quantitative and qualitative paradigms.

Paper 2 - Troubling the gender binary in mathematics in survey research

[Shunqi Zhang](#), [Laura Black](#), Maria Pampaka – University of Manchester

In this paper, we report on secondary data analysis of a previously validated measure of mathematics identity (Pampaka & Lo, 2014), aiming to problematise the gender binary in statistical analyses and develop more variable constructs that might be said to be 'gendered' – e.g. asserted allegiance to hetero-patriarchal forms of mathematics. Drawing on longitudinal surveys of secondary school students (www.teleprism.com), we hypothesise that some of the 'maths identity' items might be re-read in ways that would allow us to explore students' adherence to a form of 'masculine mathematics' (Mendick, 2006). Using Rasch analysis, we examine whether these items might form a unidimensional construct and consider the effect of this newly constructed measure (compared to previously calibrated measures of maths identity) on regression models of attainment and soft learning outcomes (maths self efficacy, disposition). We discuss these new measurement and modelling findings in light of other

Paper 3 - The experiences of queer and gender non-conforming young people in mathematics
Kate O'Brien, Tee McCaldin, Diane Harris, Shunqi Zhang, Laura Black – University of Manchester

This paper reports on survey and biographical interviews with undergraduate students who self-identify as queer or not conforming to a cis-gendered male/female binary. While several recent studies investigate the experiences of queer and transgender students in postsecondary STEM settings (Kersey & Voigt, 2021; Leyva et al., 2022), this study explores the retroactive and reflective accounts of genderqueer students to better understand the development gender-math relations before university. Working with students from a diverse range of undergraduate courses – both courses with a large quantity of mathematical content and those with limited mathematical engagements – we use identity-poems, gender visualisations, and other biographical methods to examine how students understand the co-emergence and entanglement of their mathematical identities and gender identities.

Paper 4 - Theorising gender otherwise - what next?

Julian Williams, Clelia Cascella, Kate O'Brien – University of Manchester

In this paper, we seek to conceptualise gender in a post binary era using our cultural-historical research methodology. We consider a number of ways that this might be done, e.g. by scaling the degree of masculinity on a scale from – infinity (non-masculine) to + infinity (machismo masculinity). But these quantisations are never just about quantity, they are always also qualitative. We proceed to explore the qualities of sociocultural constructs that might be taken to mediate the work of gender identification, in clothing, music, sexuality, mathematics identification etc. A combination of case study and survey method will be proposed to investigate the problem empirically, which we suggest will be culturally-historically contingent, and inherently fluid.

References

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Themes

Diversity, Inclusion and Social Justice

Second Theme

Mathematics Education