



Doctoral research as team enterprise: the continuing legacy of Professor Rosalind Driver

● Kate Greer ● Sophie Perry ● Shirin Hine ● Lucy Wood
● Liam Cini O'Dwyer

Abstract

Doctoral research can be a daunting prospect. Would-be scholars might be deterred from embarking on a PhD by financial stress, tales of isolation and difficult relationships with supervisors, or by the intimidating prospect of the required intellectual effort. In this article, we, the authors, offer a more positive take on the PhD process by reflecting on our own experiences. In recent years, we have all undertaken doctoral studies at King's College London's (KCL) Centre for Research in Education in Science, Technology, Engineering and Mathematics (CRESTEM), thanks to scholarships from the Rosalind Driver Memorial Fund. In doing so, we have continued to build on the legacy of Rosalind Driver, or Ros, as she was more commonly known, pursuing our own research interests and forging new pathways of enquiry, all while immersed in a collaborative research community at KCL. In this article, which we write at the time of the 25th anniversary of Ros Driver's death, we reflect on some of the links between her work and our own research and demonstrate how her legacy continues to influence science education research and practice today. We hope to encourage others involved in science education to consider how they might bring their expertise to this diverse research field.

Rosalind Driver's (1941-1997) academic career began with her PhD, awarded in 1973 by the University of Illinois. In 1974, she moved to the University of Leeds, first as Lecturer and then as Chair in Science Education. Driver moved to KCL as Professor of Science Education in 1995. She was a central figure in the constructivist movement (Osborne, Leach & Scott, 1997), with her work challenging what was a dominant perception of science students as 'empty vessels' who were understood to receive information unidirectionally from their teachers. Through individual and collaborative publications such as *The Pupil as Scientist?* (Driver, 1983), *Young People's Images of Science* (Driver, Leach & Millar, 1996) and *Making Sense of Secondary Science: Research into children's ideas* (Driver et al, 1994, 2014), she helped to shift thinking towards appreciating the active role that students play in learning as they interpret their unique experiences. Many readers will recognise her constructivist-oriented ideas, which maintain their relevance in science education today, both in academic and classroom settings.

Having worked as a teacher prior to her PhD, Driver's science education research had a real-world focus. She explored classroom experiences in ways that helped to directly influence teachers' practice. The science teachers with whom she worked became collaborators in her research, reflecting directly on their practice and, at times, continuing on to study in higher education. Our research has similarly been shaped by our pre-academic careers. Our doctoral studies have been influenced by our work related to science education, be that teaching in formal and non-formal settings, or in more policy-oriented capacities. Thus, our research is anchored in reality: the questions that we ask explore barriers and tensions that exist amongst practitioners currently working in science education-related policy or practice.

The Ros Driver Scholarships have enabled us all to explore and expand our individual interests in science education practice and policy. As illustrated by our researcher biographies below, these interests point to the enormous diversity within the field of science education research. Liam is making students his focus





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by exploring how science education impacts students' identity and how these factors influence decisions on continuing with post-compulsory science education. In contrast, Lucy places teachers at the centre of her enquiry by investigating the choices that they make when undertaking practical science work in the classroom. Building on their experience in environment-related education, Kate, Shirin and Sophie's projects are indicative of the potential of science education research to tackle pressing issues.

A final aspect of Ros Driver's legacy that speaks to all our experiences was her commitment to research as an inclusive process, as part of a '*team enterprise*' (Osborne, Leach & Scott, 1997, p.3). It is possible that the academic freedom that can come with a PhD, and the isolation that can be associated with independent study, might have found us floundering as early career researchers. However, with the support of our supervisors and colleagues, we have been welcomed into the team enterprise of science education research. As members of CRESTEM, we have joined a research community that provides guidance and freedom in equal measure, offering us encouragement, fostering our confidence, and emboldening us to experiment as our research careers develop. We all offer huge thanks to our supervisors for their continued guidance and support: Dr. Richard Brock, Dr. Melissa Glackin, Professor Christine Harrison, Professor Lulu Healy, Professor Heather King and Dr. Tania de St Croix.

More about the Scholarship

In England, scholarships supporting doctoral studies in education and, more specifically, science education, are rare. The Rosalind Driver Scholarship (<https://www.kcl.ac.uk/ecs/research/scholarships-in-crestem>) at King's College London has funded doctoral studies in science education since 2003. To date, over 24 recipients have benefited from the generosity of the Driver family, with many awardees going on to lead and inspire in sectors such as teacher education, academia and science engagement and communication. For example, Dr. Andri Christodoulou, graduating in 2011, studied the science classroom as a site of epistemic talk and is now a lecturer in education at Southampton University; Dr. Emily Dawson, graduating in 2011, studied non-participation in public engagement in science and is now a professor in Science & Technology Studies at UCL; and Dr. Amy Seakins, graduating in 2014, studied the impacts of scientists on visitors at museums and is now head of public engagement at Imperial College London.

The scholarship is a 3-year full-time award, which covers the cost of tuition fees and a £20,000/year stipend. The admission process requires that candidates produce their own research proposal and research questions. More information can be found at <https://www.kcl.ac.uk/study-legacy/funding/studentship-in-science-education-rosalind-driver-scholarship-fund-rdsf>

Continuing the Driver legacy: the authors' research experiences

Dr. Kate Greer, 2017-2020, full-time

Thesis title: *Governmentalities of climate change education: perspectives from history, policy and position-holders.*

As the environmental and climate crisis intensifies, education programmes designed to explore and address related problems remain on the margins of mainstream education practice. While activists are calling for 'more!' climate change education, is the solution merely to insert more?





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I came to my PhD having worked in civil service and non-government roles related to climate change, sustainability and environmental education. Having experienced first-hand the commitment and effort of researchers, policymakers and practitioners towards designing and implementing effective environmental and sustainability education, I was troubled by the apparent lack of progress being made in education to address the crisis, and unconvinced about my own impact. While it can be easy (and, at times, justifiable) to point the finger at policy for failing, I wanted to develop a deeper understanding of the factors that are hampering progress.

So, motivated by my policy and practice experience, and supported by a Rosalind Driver Scholarship, I embarked upon my doctoral research, which 'excavates' England's climate change education policy landscape to identify structures, processes, beliefs and values that enable climate change education to continue to be marginalised. Unless we can understand these factors, future initiatives are just as likely to be sidelined.

Dr. Lucy Wood, 2018-2022, full-time

Thesis title: *Science practical work: exploring the interplay between teachers' self-efficacy, pedagogical beliefs and classroom practice.*

Many science teachers in England see practical work as an integral part of their teaching repertoire. I, too, developed a strong commitment to practical-oriented teaching during my 14-year career in primary and secondary schools. There is a wide range of possible purposes for practical work, and a variety of pedagogical approaches can be adopted to meet the prioritised learning outcomes; however, little is known about the complex factors that inform teachers' choices about practical work. My doctoral research sought to explore these factors by looking through the 'lenses' of teachers' beliefs and self-efficacy, and it provides fresh insight into how current education policy in England is shaping classroom practice.

I found my PhD to be a fascinating journey of challenging my own preconceptions about practical work, supported by rich discussions with my fellow 'PhD-ers' and supervisors. Rather than a lone endeavour, I was able to share my emerging findings with various audiences, articulating my ideas and using feedback to further refine my analysis and writing en route to my final thesis. I was also able to be involved in other research projects alongside my own doctoral study, gleaning valuable insights from more experienced academic colleagues along the way. My doctoral experience has left me convinced about the value, and enjoyment, of research as 'team enterprise' amongst teachers and researchers, and I am excited about the opportunities ahead.

Shirin Hine, 2019-present, part-time

Provisional thesis title: *Understanding contemporary Forest School practice in England and its potential to support gender equity in environmental education.*

In view of current environmental and social crises, my research explores Forest School's potential as an 'alternative' approach that might provide learners with more socially equitable, less anthropocentric Environmental Education (EE) than that offered within the National Curriculum. Using ecofeminist theory, which draws on the concept of gender to analyse relations between humans and the natural world, I





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focus on Forest School's ability to support gender equity as an indicator of its potential to offer more effective EE.

My fascination with Forest School arose from volunteer experience at my local primary school, where I witnessed the positive – sometimes transformative – effects of this approach on children's interactions with each other and their environment. My PhD research combines this with my interests in gender equity and children's right to play, developed during my MA in Child Studies at KCL, and explores these ideas within the context of EE. With this PhD, I aim to contribute to the emerging area of Forest School research and respond to the urgent need for greater consideration of gender equity in EE research and practice more broadly.

Sophie Perry, 2020-present, full-time

Provisional thesis title: *Exploring Environmental and Sustainability Education – how do educators' plans and intentions for their work translate into practice?*

My work explores the role of education in light of the intersecting climate, biodiversity and social crises, focusing on factors that affect educators' practice and learners' experiences. Education is often referred to as a tool that can produce the citizens required to transform our futures. My research goes beyond this rhetoric – that, if we teach learners well, they will be our saviours – and aims to recognise, reflect upon and challenge the contexts that play a part in hindering Environmental and Sustainability Education (ESE) from achieving transformative outcomes for individuals and society.

I come to this research with a background in facilitating and co-ordinating non-formal science learning programmes. My experiences left me with questions around how, despite the best intentions of educators, contextual barriers and structural 'rules' can hinder both the learning experiences of ESE and the ability to apply these learnings in society.

My PhD is a qualitative investigation of three ESE case study sites, which span both formal and non-formal learning environments. In each case, I conduct: a) interviews with educators, to understand the aims and ambitions of the programme; b) observations of the sessions in practice; and c) interviews with learners to explore how the programme interacts with their own unique perspectives.

Liam Cini O'Dwyer, 2021-present, part-time

Provisional thesis title: *Investigating issues of participation and exclusion/inclusion in secondary school science education, using Lesbian, Gay, Bisexual, Transgender, Intersex and other non-cisgender-heterosexual (LGBTI+) perspectives.*

As a gay man and science teacher, I am interested in exploring how LGBTI+ youth experience science education, how included or excluded they feel, and what factors influence their decisions to participate in science education post-compulsory level. I seek to question the extent to which LGBTI+ youth of today feel that their LGBTI+ identity impacts their science goals and aspirations, and the ways in which science education impacts their ideas of self and LGBTI+ identity formation.

Whilst LGBTI+ identities have become increasingly visible in recent years, there has been limited research exploring the experiences of LGBTI+ youth in science education. Consequently, science education





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policymakers are at risk of, at best, assuming what the science educational needs of LGBTI+ youth are and, at worst, ignoring them altogether. Such limited consideration and explicit inclusion of LGBTI+ youth could result in their exclusion from and/or low participation in science education post-GCSE, particularly when compared with their cisgender heterosexual peers. My research aims to identify any barriers to science education participation faced by LGBTI+ youth and to explore strategies that could boost their inclusion.

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