

CASE STUDY

Developing pedagogical research methods at Durham University

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Abstract

In this article, we examine the challenges faced by Education-track staff as they begin to conduct scholarship and/or pedagogical research. These may include a lack of familiarity with qualitative research methods; uncertainty or lack of confidence when choosing and applying theoretical frameworks; and inconsistent Departmental or University resources for conducting this research. We outline the approach we have taken in the Education and Pedagogy Group at Durham: a series of linked, concurrent research projects, using the same methodologies and approaches (in this case, focus groups and thematic analysis). We discuss the benefits and challenges of this approach, and make some recommendations for how other groups could apply it in their own contexts.

Keywords: Qualitative research, building scholarship capacity, methodological case study.

1. Introduction and context

Education-track staffⁱ are an emerging group within academic departments: in the UK, the proportion of academic staff on education-focussed contracts has increased from 25% in 2015 to 36% in 2024 (Perrot, 2025). In the Maths department at Durham University, and many others around us, this increase coincides with a shift away from temporary contracts and towards permanent academic positions. Correspondingly, our workload has shifted away from high-volume teaching and now includes more educational innovation and leadership, with a new expectation that we should begin to undertake scholarship and/or pedagogical research (Bull et al, 2025).

Defined as scholarship “aimed at understanding and improving discipline-specific teaching and learning” (Dolan et al., 2018), Discipline-Based Education Research (DBER) can be a useful framework for Education-track academics in this context. It represents an interdisciplinary challenge for us: our training and expertise lie in mathematical fields, rather than in social sciences. In many ways, we are extremely well-placed. As experienced educators, we have deep and nuanced understandings of our topics and their particular challenges. We maintain networks with other education-focussed academics, fuelling our awareness of discipline-specific pedagogical developments. As a result, we are “uniquely placed to bring to bear [our] deep familiarity with the subject, allied to [our] pedagogical content knowledge, in order to play an integrated role” (Galloway and Hernandez-Martinez, 2017). In contrast to our colleagues in Education departments, we also

have direct contact with mathematics students, giving us insight into their learning; how they view their education, their peers, or emerging technologies; and the effects of small changes in format or content.

On the other hand, undertaking this work does not only require discipline-specific knowledge. Evans' model of the "integrated academic" identifies seven key factors for high-quality education research, including Research Methodology Expertise, Data Analytic Competence, and Critical Pedagogy (Evans et al, 2021). For many of us, working with theoretical frameworks, ethical conventions, evaluative practice, and both qualitative and quantitative methodologies is outside our comfort zones, lying in the less-familiar territory of social sciences. While this is not an uncommon position – Dolan et al describe "self-teaching by reading and professional development" as a primary way in which DBER researchers can develop education research skills (Dolan et al, 2018) – there is little existing literature providing experiential perspectives on *how* to go about this retraining.

Currently, Mathematics departments are facing new and pressing questions, including how to maintain teaching quality with changing staff-student ratios; how to react to generative AI while preserving educational integrity; and how to provide for diverse and changing needs within the student body. While these questions are faced by all teaching staff, it is our experience that education-focused staff in particular are the ones asked to consider them. Framing this existing work as DBER can help us to make sure that it is robust, collaborative, and has a broader reach, attaining the "pragmatic" quadrant of Evans et al.'s typology of pedagogical research (Evans et al., 2021). Additionally, given that our research time is often less protected than that of our research-and-education colleagues, it is pragmatic to use our existing work as the basis for scholarship through DBER.

However, it can be difficult to know how to begin a first DBER project. In the rest of this article, we outline an innovative approach taken by a group of education-track academics in the Mathematics department of a large, research-focused University. As of 2025-26, this Department numbers approximately 110 staff. Within this, the Education and Pedagogy group numbers ten permanent education-track staff; one teaching fellow; five affiliated PhD students, and around five interested education-and-research staff.

We present this paper as a capacity-building and methodological case study. We hope that it will form a blueprint for other academics beginning their DBER careers, and provide some of the guidance that we would have liked to receive. We have chosen to include the reasoning behind some of the decisions taken in the first stages of the research project, in the hope that it will prove helpful to other researchers in our position.

2. Methodology

We organised concurrent research projects, based around similar research questions and using collaboratively established research protocols. At some stages, we worked together as a whole group; for other parts, each sub-group worked independently. See Figure 1 for a detailed timeline of the project.

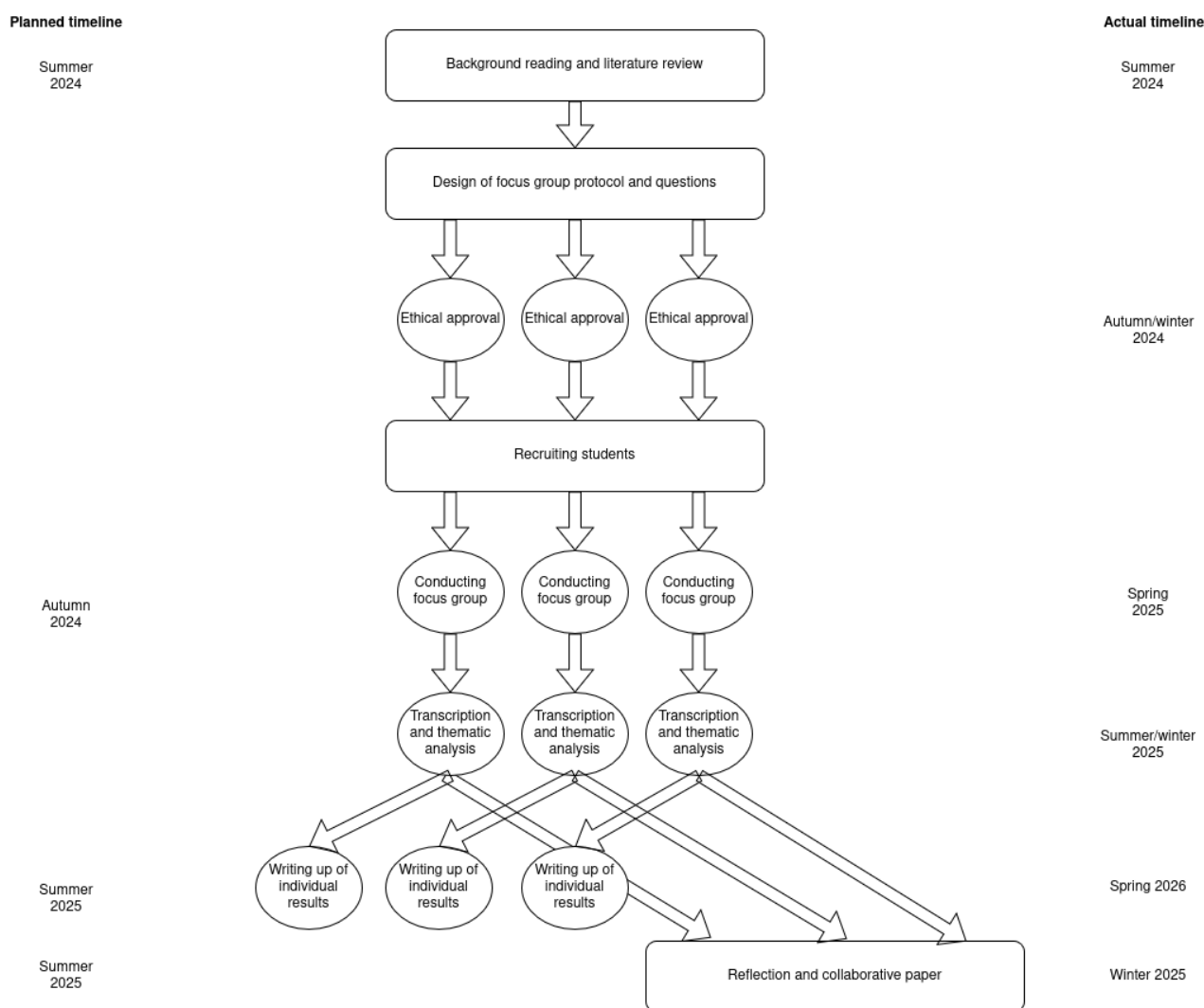


Figure 1. A figure indicating the different stages of the collaborative research project, demonstrating which parts were done collaboratively and which were done as a whole group. It also shows the anticipated and actual timelines of the project.

By working both collaboratively and separately on our projects, we were able to build experience of scholarship projects from beginning to end. Our chosen approach enabled all members of the team to develop pedagogical research skills and take ownership of their own projects, while maintaining a group structure that encouraged progress and continued motivation from all members. We feel that this approach has two key advantages over a larger shared project. Firstly, as a large group, we were able to involve many more people in the project without it becoming too complicated or unwieldy. Secondly, it ensured that every member of the group had the opportunity to engage in every stage of the process equally, avoiding a scenario where each person became an “expert” in one aspect without being exposed to others.

2.1 Research questions

A key early decision was the choice of research questions. By devising a suite of linked, but distinct, research questions, we hoped to achieve three goals: first, to answer pressing questions being asked in our department; second, to enable all group members to take ownership of an individual project; and third, to maintain as much coherence as possible between the methodologies of the different strands. Our overarching research question was therefore

RQ: How do students use resources?

This question, in different forms, was of interest to many members of the group, whether they were involved in developing accessible html resources, discussing a new departmental policy about student use of generative AI, or working to optimise the staff time and workload involved in different teaching activities. By selecting a version of this question that interested them particularly, each group member was invested in the research for its own sake and not only as a learning exercise.

In group discussion, we established a total of nineteen possible versions of the research question, ranging from “How do students interact with support classes” to “How do students use generative AI”. From this list, and based on individual interests, we formed three pairs, each working to answer one of the following research questions.

RQ1: How do students use feedback?

RQ2: How do students use lecture notes?

RQ3: How do students use external resources?

While there is plenty of excellent research into these questions – see, for example, Ni Shé et al, 2017 – we felt that the context had changed sufficiently to require re-examination. Our students receive both written and computer-generated feedback on their work and have access to lecture notes and external resources in a huge variety of formats. Gaining extra understanding of the current state of students’ approaches to these resources would be both timely and informative.

The decision to work in pairs, rather than individually, was carefully taken. We wanted to prioritise questions that were directly relevant to current discussions in the department, and that were likely to lead to high-quality research. Working in groups also meant that there was more opportunity for additional members of the wider group to participate in ways that worked for them, joining or leaving the project as needed.

2.2 Focus groups

We decided to prioritise a qualitative research method in this project. As some members of the group with more statistical backgrounds had quantitative experience, we felt that the group’s energy was best dedicated to learning a skill that would be new for everyone. We also felt that it would be most practical to choose a methodology involving relatively few students. We had a relatively small budget to pay participants for their time; previous large surveys had produced relatively low response rates. This led us to two primary protocols: semi-structured interviews and focus groups. Because we hoped to understand a range of student perspectives on the questions, without generating longer transcripts than we were prepared to analyse, we selected focus groups as our main research protocol. Given the budgetary and time constraints, we elected to run one focus group per “theme” (with an additional session, dedicated to postgraduate students, for the external resources theme). While best practice suggests that one should run multiple focus groups, we chose to balance this consideration against the practicalities of the project. Our primary aim was to gain valuable experience for future research projects.

Each focus group was led by two staff members: one was designated the “speaker” and the other the “note-taker”. This meant that almost everyone was able to participate in a focus group, even if they did not lead it. In future iterations of this project, we plan to ensure that group members who took “note-taker” roles will also take a turn to lead a session.

We recruited undergraduate students studying Mathematics or Mathematics and Statistics degrees, using an “expression of interest” form that did not distinguish between the three possible themes. Each focus group invited six students to participate; on the day between five and six students attended each one. As noted in Section 1.3, when allocating students to topics we avoided placing students with researchers they knew well or had worked with closely, although inevitably some students had crossed paths with the researchers in the past.

We broadly followed the focus group protocol outlined in (Brown and Edmunds, 2011). We found this to be an accessible and helpful resource as first-time researchers in this context. For each of the three topics, we planned an introductory warm-up activity and around four “key questions” to ask the students.

The warm-ups consisted of a prompt, which students were asked to answer using post-it notes, either listing elements of good feedback, ways in which lecture notes are used, or different external resources that might help them to study. We hoped that these activities would encourage students to think about the research questions on their own terms, without being influenced by our opinions. Following this activity, the researchers asked students a series of questions, referring to their previous answers and leading to more guided discussions of each research topic.

The timing of the questions and the discussion was one area which all the researchers found particularly challenging. Reflecting afterwards, we felt that “finding the balance between letting students say their own things, and trying to keep them on topic, is harder to achieve than [we] realized” and that we had not been sure when it was best to let students keep talking, and when it would be better to move them onto the next question. This is an area we hope to develop in future focus group projects.

We recorded each focus group using Microsoft Teams, which automatically produces a transcript. These transcripts were edited by the researchers, for clarity and to distinguish between the individuals speaking at each point. Although our early estimates for how long each stage of the project would take were almost universally too short, this was particularly true for transcription. We wanted to ensure that all members of the group would gain experience in every stage, but assigning different parts of the transcript to different group members and then re-unifying our approaches was a particularly time-consuming task. We agreed to take a verbatim transcription approach, but remove filler words which could “detract from the content of the interviewee’s words and...make the interviewees appear less articulate than they really are” (MacLean et al, 2004).

To analyse our data, we used thematic analysis. It is a widely-used technique, (see, eg, Iannone and Miller, 2018 or O’Neill and Padden, 2022), which we therefore felt would provide us with a highly transferable skill for later research projects.

We followed the approach described in Braun and Clarke, 2006, which comprises six stages: familiarise yourself with the data; generate initial codes; search for themes; review themes; define and name themes; and produce the report. As we noted above, almost all of these stages took longer than we anticipated at the beginning of the project. We used an inductive coding approach, to “let the data speak for themselves”, with nVivo as our primary coding software.

2.3 Ethical research

A particular novelty for most of the participants in this project was that this research required directly collecting and analysing data from people, requiring ethical approval. Although this seemed intimidating at first, the structure of the project made it a particularly effective learning experience. As a very standard focus group project, there were no unusual or difficult ethical concerns to address

in the ethics form. To streamline the submission process, we worked together to draft one version of the form, to be submitted first, before implementing any requested changes and then adapting this submission for the other two sub-groups. Our University's Centre for Academic Development provided training and easily modifiable template consent forms, participant information sheets and data management plans, all of which made this process simpler than we first expected. The ethics form was sent to our Departmental ethics committee for approval. Due to our significant preparation and the relatively simple nature of the project, our ethics form was accepted without any suggested changes, but as the ethics team was unused to projects of this type, it did take them two months to get back to us. Two specific ethics related aspects merit particular comment. Firstly, we were lucky that we were able to pay our student participants (£15 in gift vouchers). This was a fair way of rewarding students for their participation in the project and encouraged a wider range of students to volunteer. This cost the Department about £250 in total, which is not completely insignificant for a new research group in the current financial climate, but we were able to argue successfully that this was good value and a low price compared to the costs of other groups' projects.

Secondly, we had to consider issues relating to positionality (Braun and Clarke, 2021). This primarily related to students' perceptions of us as lecturers. We could be thought of as being in a state of fluid identity (Thompson and Gunter, 2011) with respect to our students: our prior experience of being maths students may make students more comfortable with us, but students might be cautious of us given our position as authority figures. This might affect how honest they were in their answers, and particularly criticisms, especially as we were recording the focus group, which can be a concern even if we promise anonymity – the well known 'recorder phenomenon' (King, Horrocks, Brooks, 2018). Additionally, as the data we were analysing related directly to our own work, our own conscious and unconscious biases would affect how we would interpret what the students said. To mitigate both factors, we excluded students with whom we had a close educational relationship. This still did leave room for significant bias to creep into our results, but this could not be resolved while we were studying students in our own department and being aware of this in our analysis was important. Future work using other methodologies (such as questionnaires) or collaborations with other institutions, where we might interview each other's students, may reduce this bias further.

3. Reflections

3.1 Reflecting on our skills

This project has allowed us to develop our research skills, both individually and as a group. As an internal reflective measure, each group member completed "before and after" self-assessments of their confidence in each of the seven aspects of an "integrated academic" listed in Evans et al, 2021, shown in Figure 2.

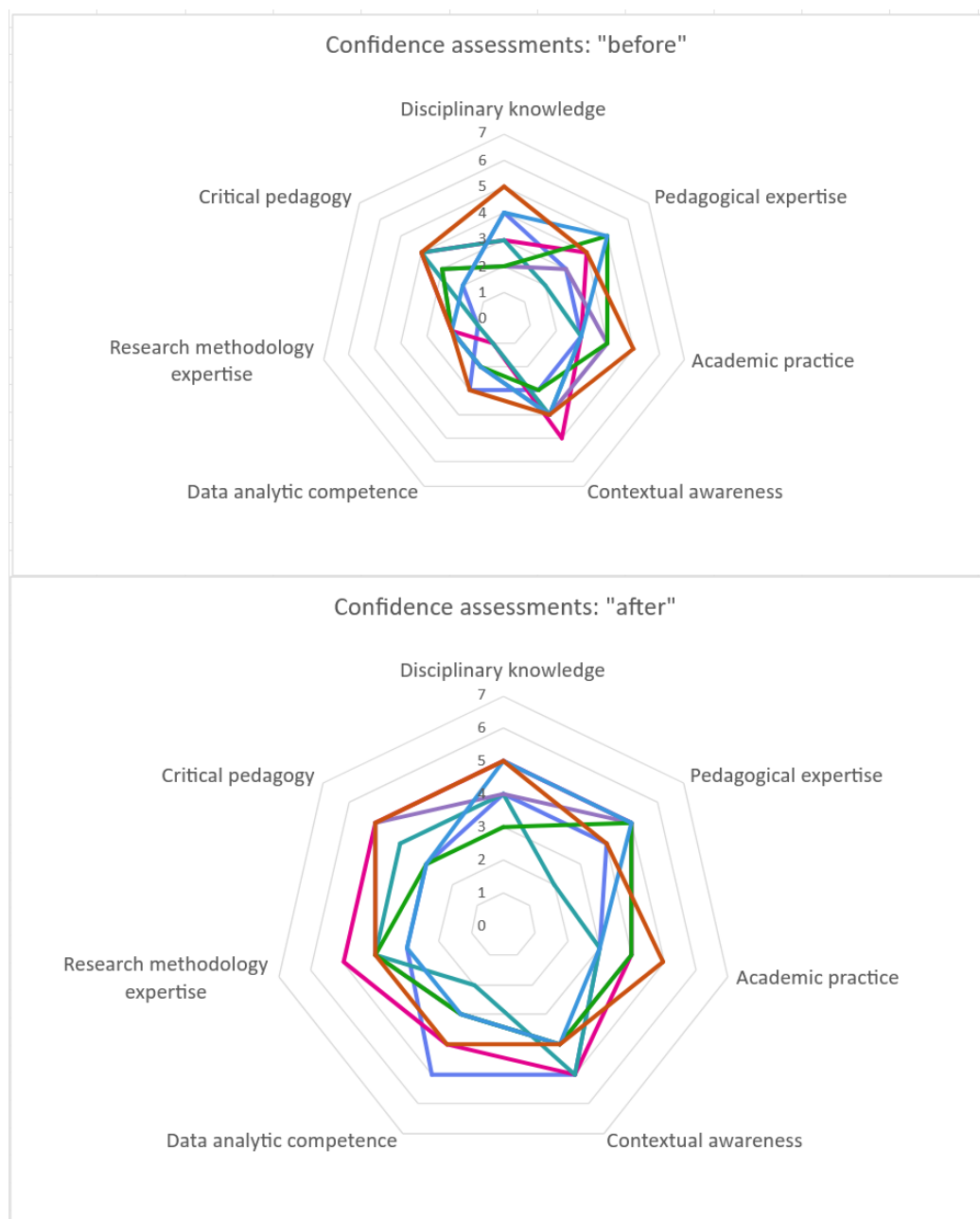


Figure 2. A figure containing each group member's self-assessed confidence "before" and "after" the project, in each of the seven aspects of an integrated academic (Evans et al, 2021).

We were initially confident in Disciplinary knowledge, Pedagogical expertise, Academic practice, Contextual awareness, and Critical pedagogy, with average "before" self-assessments between 3 and 4 out of 7 for these factors. However, our collective confidence in our Data analytic competence and Research methodology expertise was much lower, with group average scores between 1 and 2. This reflects our position as budding DBER practitioners: we had experience and confidence in the practice of teaching, but were less assured in the research and scholarship aspects. The average "after" scores are higher in all categories, with the biggest increases in the two categories where we were previously least confident.

3.2 Using the group structure

A key factor in the success of this project was the group structure. Our Pedagogy Research Group, which had been meeting for some time to read and discuss pedagogical literature, had previously undertaken informal surveys of student attitudes. This structure was valuable in its own right: even before the project started, we were used to working together as a collegial, productive group. Running the project as a group endeavour on one hand, and independent research projects on the other, means that we have access to opportunities not only for individual development and ownership, but also the support and motivation of other group members. We recognise that not all Departments have such large groups of people interested in DBER. We note that there are increasingly active networks of pedagogy-focussed mathematicians in the UK and elsewhere and would encourage collaboration between smaller groups.

3.3 Leadership and sharing responsibility

Equally valuable was clear leadership. Each sub-project had a nominated “leader”, but so did the project as a whole. By making one person responsible for the continued progression of the project, it was always clear who would organise the next meeting, find new papers to read, or decide what to do next to move the project forward. As a large group with wide-ranging interests, the natural tendency was for us to move in different directions or find different projects to focus on. This is a strength of the group, but without this leadership the balance between allowing for individual circumstances and maintaining group momentum would have been difficult to strike.

3.4 Structural support from the department

Support from our department has also been vital. This has come in the form not only of a small budget to pay our participants, but also as protected “scholarship” time. In the current system, 20% of our time is assigned as scholarship. This is treated in a similar way to the 40% protected “research” time for our research-and-education colleagues. This structure has allowed us the space and freedom to dedicate the necessary time to reading literature and planning and undertaking projects such as these.

3.5 Clarity of purpose

It was also important to be clear about the goals of the project. Is the point to write and publish a first research paper, or is the focus more on the development of skills? How each of us answered this question naturally affected how we viewed our roles, aims, and level of participation in the project. This difference in perspective can be a benefit to the project, rather than a drawback: a key strength of the format is its flexibility. This has also allowed group members to participate in as many stages as they choose to, including several members who joined a year after the project began. Other members of the wider Education group in the department, who could not dedicate as much time to the project, very generously shared their expertise at relevant moments. On the other hand, our determination to involve as many people as possible in every stage of the project contributed to the timing issues noted above. Expectation-setting was key to navigating these issues.

3.6 Next steps

The analysis of the results of the focus groups is forthcoming, and we also plan to continue using this structure as a framework for future research projects. By changing the theoretical framework and research protocol, we will develop our expertise in other areas, with a particular focus on quantitative methods for our next project. Our confidence assessments suggest that gaining experience with quantitative data, to improve our “data analytic competence,” will be a fruitful next step for the group. We also plan to assign different roles to each group member, and in particular to

choose a different leader, to ensure that more group members have the opportunity to develop project management and leadership skills.

Overall, this project has provided a fun, engaging, and supportive environment in which to undertake a first DBER project. It has improved the skills and confidence of the whole group, and several of us have moved on to individual DBER projects of our own. We would thoroughly recommend this approach to DBER, and welcome any contact or questions from other groups beginning similar projects.

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ⁱ Here we define education-track staff as academics whose primary focus is on pedagogy and/or scholarship. We are sited within our disciplines, rather than in Education departments. Different names for staff in these roles are used across the sector: they may be referred to as teaching-track, teaching-focussed, teaching and scholarship, or education-focussed staff.