

SUSTAINING ENGINEERING EDUCATION RESEARCH: SHARING QUALITATIVE RESEARCH DATA FOR SECONDARY ANALYSIS (WORKSHOP)

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ABSTRACT

The need for secondary data analysis practices emerges from multiple sources. Qualitative researchers often have rich data sets that far exceed the time available for data analysis, and many of us wish that someone could spend more time with the data. We also recognize that local data sets would benefit from further analysis that linked our data with related data collected in different contexts. Many also grapple

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with increasing data sharing requirements from funding agencies that raise concerns about participant confidentiality and data integrity. This workshop provides a chance to explore potential responses to these concerns through a robust dialogue around secondary data analysis practices and pitfalls.

1 MOTIVATION AND LEARNING OUTCOMES

1.1 Motivation

The need for secondary data analysis practices emerges from multiple sources. Qualitative researchers often have rich data sets that far exceed the time available for data analysis, and many of us wish that someone could spend more time with the data. We also recognize that local data sets would benefit from further analysis that linked our data with related data collected in different contexts. Many also grapple with increasing data sharing requirements from funding agencies that raise concerns about participant confidentiality and data integrity. This workshop provided a chance to explore potential responses to these concerns through a robust dialogue around secondary data analysis practices and pitfalls.

1.2 Learning Outcomes

As a result of this workshop, participants should now be able to:

- describe what secondary data analysis (SDA) encompasses;
- identify potential challenges and opportunities with SDA;
- explore if, and under what conditions, one or more of their existing or planned data sets might be amenable to SDA;
- identify concrete steps needed to make data available to other researchers for collaboration using SDA and/or to work with data from other researchers.

2 BACKGROUND, RATIONALE, AND RELEVANCE

Qualitative researchers often collect extensive data sets encompassing hours of interviews and observations, much of which often remains underexplored. But tapping the rich potential of these data sets has thus far been challenging despite ongoing calls for data sharing by funding agencies. Concerns about ethics, participant confidentiality, misuses of data, and more are compounded by disciplinary and publication practices that value original data over integrative efforts based on secondary analysis. Additionally, institutional reward structures may discourage the kinds of collaborations needed for data sharing. As a result, changing the paradigm of single-use data collection requires actionable, proven practices for effective, ethical data sharing, coupled with sufficient incentives to both share and use existing data. At the same time, globally, qualitative research continues to be a challenging paradigm for new researchers, especially those transitioning from technical engineering research (e.g., Dart, Trad, and Blackmore 2021; Gardner and Willey 2018), and learning qualitative methods requires time and guidance. To address these and other issues, this workshop draws on findings from a U.S.-based project (Paretti et al. 2023; Case et al. 2023) on secondary data analysis (SDA) to stimulate dialogue with a broader international group of participants that explores what SDA is, why and under what conditions participants do or might make their own data available for SDA, and what philosophical considerations and practical steps are involved in such data sharing.

Notably, discussions of secondary data analysis, though not widespread in our field, are not new. Our work in this area integrates and extends previous conversations such as those presented by scholars from a range of countries and contexts in a 2016 special issue of *Advances in Engineering Education* (e.g., Johri, Vorvoreanu, and Madhavan 2016; Trevelyan 2016; Walther, Sochacka, and Pawley 2016). In our own recent work (Paretti et al. 2023), we have used the work of two pilot teams to identify the benefits and challenges of collaborative SDA as a means to build capacity and engage new scholars into engineering education research. This work has allowed us to build a framework for collaborative SDA that honours the time and effort of both participants and original researchers, while making space for new scholars to engage with existing data in new ways. Prior to SEFI, however, this framework had not been explored in international contexts, where both regulations and ethical practices related to human subject research can vary widely.

3 WORKSHOP DESIGN

Because SDA is not a one-size-fits-all endeavour, this workshop was designed to help participants think more creatively, expansively, and critically together about the role of SDA in engineering education research. The timing and content of this 60-minute workshop was as follows:

- 5 minutes Overview: Working definition of SDA, followed by a brief explanation of our overall SDA project goals and national context.
- 10 minutes National Contexts: Input from audience members to identify national/regional contexts and policies surrounding data sharing.
- 5 minutes Pilot Project Results: Guiding practices and challenges that have emerged from two pilot projects conducted over the past year.
- 15 minutes Small Group Discussion
 - What existing data sets do you have that could be amenable to SDA? What opportunities does SDA offer for that data?
 - What challenges does SDA pose for that data?
 - How do national regulations impact your data sharing practices?
- 15 minutes Reporting out from Small Groups and Discussion
- 10 minutes Next Steps: Opportunity for networking across institutions and contexts to identify potential SDA partnerships.

4 RESULTS OF THE WORKSHOP

The workshop was attended by 30 participants representing 16 countries (11 in Europe as well as Australia, China, Qatar, South Africa, and the U.S.). More than half of the participants were working in contexts where data sharing was either mandated or strongly encouraged, and approximately half had prior experience with secondary data analysis.

The workshop facilitators shared the emerging, as but as yet unpublished, framework developed in the U.S. to guide collaborative secondary data analysis, tentatively labelled SHARE, with key principles formulated as follows:

- **Stewarding collaborative relationships**
- **Honoring the context of data**
- **Aligning questions and data**
- **Responsibly reusing data**
- **Expanding capacity and ownership**

This framework (more details in a forthcoming publication) is designed to address the ethical and practical issues related to sharing data for secondary analysis. It seeks to protect and benefit both the original researcher(s) and the study participants, while simultaneously creating opportunities for new and experienced researchers to engage with and make meaning with rich, robust existing data sets.

Workshop participants agreed that both data sharing and secondary data analysis held high potential value for sustaining and growing the engineering education community. Concerns that surfaced in the workshop echoed those that have emerged from previous discussions (see Johri, Vorvoreanu, and Madhavan 2016; Paretti et al. 2023), including the difficulty of de-identifying qualitative data in ways that protect participant confidentiality while still providing sufficient context to support later analysis and the more general challenge of understanding the context of data one did not collect. In particular, this international conversation surfaced the key issue of national context related to engineering education (e.g., how higher education is funded, how students select or are selected to universities and majors, the ages at which students are tracked into majors, and more). In addition, concerns specific to the European General Data Protection Regulation (GDPR) emerged that bear further investigation. In the US, for example, Institutional Review Boards (IRBs) regulate research at an institutional level. The EU-wide GDPR is a wide-ranging set of regulations (not aimed specifically at university research) that came into place in 2018, with significant legal penalties for non-compliance, and universities are still working through some of the implications. In this context where primary data collection is already fairly complicated and subject to multiple restrictions, it does seem that SDA will present particular challenges. Similarly, among European researchers in particular, questions arose centred on participants' concerns about the monetization of data and increasing reluctance to provide broad consent for personal data to be used beyond a narrowly constructed set of aims.

As anticipated, then, the workshop elicited critical national variations in research contexts that make data sharing and secondary data analysis challenging both within and across national borders. At the same time, participants all recognized the need for and value of such work if it can be done in ways that are ethical and attentive to the needs and interests of all parties.

5 SIGNIFICANCE AND ATTRACTIVENESS

Data sharing, and thus secondary data analysis, is increasingly important globally as a result of national policies as well as deepening interest in comparative and cross-national work, but it remains challenging for qualitative researchers concerned about a range of ethical and practical considerations. Engaging in this dialogue through a workshop at SEFI enabled us to foster a more global conversation and engage with researchers working in contexts where debates and policies on data sharing and open access are more advanced. This deeper international conversation has enabled us to explore possibilities for data sharing beyond national boundaries to support equity and sustainability in our global community. It has also guided our further thinking on the development of the SHARE framework as we consider when and where the framework can have value to the field. At the same time, the workshop enabled participants to think in more detail about the possibility of SDA with their own existing data, as well as consider how and where they might engage in SDA in partnerships with other researchers whose data is available for such work.

6 AUDIENCE

Our workshop included experienced and novice qualitative researchers interested in learning more about data sharing practices and secondary data analysis. While some participants were familiar with SDA and/or had data they were considering sharing, others were at much earlier stages of their research careers. The workshop introduced key terms and ideas and create space for participants to look at data sets to evaluate if, when, and how SDA might be appropriate.

7 ENHANCEMENT OF KNOWLEDGE AND DIALOGUE

As requirements for data sharing increase globally and rich qualitative data sets remain underexplored in researchers' own archives, discussions about secondary data analysis are increasingly important. How, why, and under what conditions we engage in analysis of data collected by other researchers are essential questions for our field. By fostering broad dialogue around these issues, sharing insights from our own work, and learning from practices and projects developed by others, the engineering education community can build intentional, carefully considered knowledge about ethical, effective, and meaningful secondary analysis in our field. Participants left with a potentially actionable framework for conducting collaborative SDA, examples of when SDA may and may not be appropriate, and a clear sense of their responsibilities either as the original researchers or those coming to an existing data set.

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