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(Re)Defining Engineers' Resilience: Part II Reflexive Accounts Of Doing Reflexive Thematic Analysis

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(RE)DEFINING ENGINEERS' RESILIENCE: PART II REFLEXIVE ACCOUNTS OF DOING REFLEXIVE THEMATIC ANALYSIS (RESEARCH)

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ABSTRACT

This work accompanies another paper which describes interpretivist qualitative research that made use of data from semi-structured interviews pertaining to how engineering educators conceptualize resilience and support students in its development. In that work, we utilized reflexive thematic analysis (RTA) for several reasons. Firstly, it is considered a useful method for under-researched areas. Secondly, its flexibility allows for inductive and deductive theme generation. Finally, it is considered a reasonably accessible method which we believe is important when considering 1.) the varied audience of engineering education research (EER) and 2.) the relative lack of consensus as to acceptable theoretical frameworks or methodologies for use within the space. In taking this approach, and in acknowledging its flexibility, I consider what that means for the process. RTA is not accompanied by a distinct theoretical framework, meaning researchers must clearly communicate methodological decision-making. In situating myself as an interpreter of meaning I recognize the need to share the role I play in knowledge production. Finally, being relatively new to qualitative research, I wanted to document my struggles and capture

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ways my practice has developed. I, therefore, document my reflexive process in relation to the six-stage process proposed by Braun and Clarke.

1 INTRODUCTION

In many cases, the researchers and audience involved in engineering education research (EER) will be trained in quantitative approaches and although there exists a preference for positivist studies (Beddoes 2014; Pawley, Schimpf, and Nelson 2016; Riley 2017), a wide variety of epistemologies, theories, and methods are present within the literature (Beddoes 2014). Historically, the orientation toward positivism is shaped by efforts to establish EER as a discipline, and quality criteria have been aligned with concepts of rigour (Streveler and Smith 2006). This is particularly true of the American context where these aims are heavily influenced by the National Science Foundation (Beddoes 2014, 293-312) who fund most EER. Riley (2017) claims that EER researchers fail to draw equally on all forms of 'rigour' but exhibit preference for those conforming with 'engineering rigour'. Borrego, Douglas, and Amelink (2009) describe how reviewers at an EER conference showed a lack of acceptance and understanding of qualitative work.

The reliance on quantitative methods has come under criticism, particularly by those who encourage critical research approaches. For example, Slaton and Pawley (2018) claim that the preference for 'large-n' studies means that "some stories are never studied" (p. 137) and highlight the role of "small-n" studies in allowing for a critique of discriminatory engineering education practices. However, a shift towards the use of qualitative methods necessitates "a coherent language and conceptual framework to critically engage with questions of qualitative research" (Walther et al. 2017, p. 398), Koro-Ljungberg and Douglas (2008) found that for the few qualitative studies published in the Journal of Engineering Education (JEE), there existed inconsistencies in epistemologies across research design, something they claimed limits their contribution. In a response to the number of qualitative research studies rejected from the Journal of Engineering Education (JEE), Baillie and Douglas (2014) encouraged authors to consider "the complete research design – to include the epistemological stance taken, the methodology and methods used, the role of theory, and the relationships among all of these" (p. 6). Kellam and Cirell (2018) suggest that it is "easy to gloss over methods sections without providing ample detail for new readers to understand participant selection, data collection, data analysis, and subsequent conclusions" (p.356) and that those details are needed to enable the reader to understand how researchers arrive at conclusions, the specific context of research, and subjectivities as researchers. This, they say, is critical to allow the reader to gauge the trustworthiness or validity of studies. It is, in part, in response to these concerns that I write this paper in which I document my reflexive process in relation to the six-stage analytical process proposed by Braun and Clarke (2006) and consider the roles of personal, functional, disciplinary, introspection and intersubjective reflexivity as well as mutual collaboration.

1.1 Thematic Analysis (TA)*)*

In broad terms TA is referred to as “a method for developing, analysing and interpreting patterns across a qualitative dataset, which involves systematic processes of data coding to develop themes” (Braun and Clarke 2022, p.4). TA may appear attractive to researchers within EER as it “offers an accessible and robust method for those new to qualitative analysis” (Braun and Clarke 2022, p.4). The diversity in approaches to TA and its flexibility “with regard to theory, research question, data collection method, dataset size and generation strategy, and analytic orientation…and purpose” (p. 261) allows for its widespread application within research and, indeed, is the reason for its popularity. However, this flexibility means it is difficult to offer precise ‘rules’ resulting in ‘good’ TA (2021). Since the initial publication of their approach to thematic analysis, Braun and Clarke (2006) have identified issues in the “coherence and integrity of published research” (2021, p.328) claiming to have adopted their approach. Part of the reason for such ‘problematic practices’ (Braun and Clarke 2021) and ‘conceptual mismatches’ (Braun and Clarke 2019, p.589) is the lack of published work which describes doing TA (Trainor and Bundon 2021) which leads to limited understanding about different types, and the active choices and decisions made by researchers. This makes it difficult for researchers to learn from one another, and thus for the development of quality TA. In making use of the term reflexive TA (RTA), Braun and Clarke (2019) situate researchers as interpreters of meaning, framing subjectivity as an asset.

2 CONDUCTING RTA

2.1 The Researcher

Below I have outlined aspects of my positionality in relation to the six aspects of research outlined by Secules et al. (2021).

I am currently an engineering lecturer and therefore consider myself as an ‘insider’. I was trained and socialised within a positivistic paradigm, and it is only in the last few years that I have become interested in engineering education. I am sensitive to arguments around the lack of rigour associated with qualitative research, which are prolific within my working environment, and I have previously conducted research which focused on how EER is perceived, recognized and rewarded within the UK (Wint and Nyamapfene 2022). I have been encouraged to help students develop their resilience but have received little response when questioning what colleagues (educators and those involved in employability) mean by this, why it is perceived necessary, and how it may be done. In part, this research was born out of a frustration I felt for the careless use of terms related to complex psychological constructs, something which I often associate with a lack of respect for other disciplines. I, myself, have been told that I should exhibit more resilience on numerous occasions, often in reaction to speaking about the upset I feel after experiencing, what I consider, injustice. I also feel conflicted in knowing that students can feel discontent when faced by challenging situations such as those that may help develop resilience. This is of concern for me as a junior academic, given the increasing focus on, and influence of,

student satisfaction surveys. I am aware that part of my desire to write this paper is a result of a lack of deep engagement with the RTA process when claiming to adopt thematic analysis as defined by Braun and Clarke (2006) during previous work.

2.2 The Research

The work accompanies another paper which describes an interpretivist qualitative research project (Denzin and Lincoln 2003; Lincoln and Guba 2005; Smith 1992) that made use of semi-structured interviews to collect data pertaining to how 13 engineering educators conceptualize resilience and their approach to helping students develop resilience. We (this research was conducted with another researcher, referred to as 'Researcher B' within this work. 'We' thus refers to decisions made together) decided to utilize RTA to analyze the interview data for several reasons, primarily because it was well suited to answer the research questions and aligned with paradigmatic underpinnings of the research. Secondly, it is generally considered as a useful method when studying under-researched areas (Braun and Clarke 2006) and its flexibility allows for inductive and deductive theme generation which captures semantic and latent meaning. In taking this approach, and in acknowledging its flexibility, we must also consider what that means for our process. For example, RTA is not accompanied by a distinct theoretical framework, meaning that researchers must ensure clear communication of methodological decision making. Similarly, in situating ourselves as interpreters of meaning and framing subjectivity as an asset (Braun and Clarke 2019), we recognize the need to communicate our role in knowledge production.

2.3 Data Collection

I acknowledge that my positionality has shaped not only the research topic and questions, but also the process, including data collection and interpretation. In many ways my identity helped in understanding participants and their perspectives and in building rapport and trust. However, I also recognize the tendency for my views, thoughts, and ideas to become intermixed with those of participants. I thus made regular journal entries throughout data collection. Entries were typically made directly following an interview and included details about my emotions, thoughts, and any questions I had. In some cases, interviews were long and emotionally draining, and my initial reflections were limited and thus supplemented in subsequent days. In some cases, journal entries informed changes to my interview technique, for example rephrasing questions. I occasionally engaged with Researcher B in post interview debriefs and sent transcripts intermittently. Below are exemplar journal entries.

I felt really happy and excited when [participant] said something that I believe to be true. It feels like a magical moment when you get those golden quotes that express the story you want to tell. Maybe it is also to do with validation. But I feel guilty for feeling this way. I feel like I should not have feelings about the findings of research. I will send [Researcher B] the transcript and ask for their opinion to see whether they agree with my interpretation.

I feel like maybe I became too relaxed when interviewing [participant]. It seemed more conversational, as if we were discussing and debating rather than me asking the questions. I

hope I wasn't too leading in asking questions or making too many suggestions about what an answer might be. I will have to discuss this transcript carefully with [Researcher B].

An example of an extract mentioned in the second journal entry is shown below. The participant in this case is a white, male research professor who I have known for over ten years. The individual has played a large role in my professional development and acted as a mentor. We frequently engage in friendly debate. I was surprised when the individual contacted me to take part in the research but upon interviewing them, it was clear that they had a strong interest in the promoting resilience.

Researcher: Okay umm, so a sort of aside but linked to this, like what's your view on how we develop resilience in students who are high achievers? So, what do you think of students who are used to achieving very high marks, just sort of sailing through their degree and then are exposed to the workplace or research?

Participant: Well, I think there's a misconception in your question that the students who achieve high marks are sailing through. They might appear to be but behind the scenes they're often working as hard, harder than anybody else. Those students are already resilient is my answer. I don't think you can be a high achiever without it.

Researcher: Yeah, that's interesting, I mean, I've been thinking about this…like I would consider myself a high achiever and I know that I really struggled like with research and the workplace… like it's a mixture of resilience and other things, but I was just so used to knowing what I had to do to succeed and just getting a high mark and knowing I could do that, that I just wasn't able to… it took me ages to…

Participant: Okay, let me have another crack at answering because I'm not even sure that I believe my initial answer. I think that there's a combination of two aspects drive and resilience. And there's a lovely book by Malcolm Gladwell which compares what it's like to be a big fish in a small pond or small fish in a big pond and how you adapt and how you develop in that scenario. And I think those students… high achievers… so alright, I was quite premature in giving my answer as bold as it was. I think perhaps those students have good drive. But I know students who are the best in the class and then go off to Oxford and they are no longer the best in their class and they leave and that's not particularly indicative of resilience necessarily. But then, if you're not enjoying it, why should you stick around? That's more intelligence than resilience. But certainly, you know, there are scenarios where that does happen, and those are high achievers. So yeah, okay I'm not even sure if I agree that you should link high achievement with resilience, I think you can probably link high achievement, with high drive. And then the unlikelihood to have to demonstrate resilience.

In the extract, the participant, at first, claims high achievers are resilient. Once I share my experience of struggling outside of an education setting, they admit to being *"quite premature in giving my (their) answer as bold as it was".* It appears my views have swayed theirs. In reading the transcripts I was disappointed in myself for being, what I considered, too leading, and focusing on my views as opposed to those of the interviewee. However, I also believe that the extract illustrates the role that researchers play in knowledge production. I also wonder if the extract demonstrates that findings are not necessarily always about the views of the participant, but that a finding could also be that the concepts discussed are complex and thus responses are nuanced. In this case the extract suggests contradictions in how educators understand resilience and the factors which influence it which is, in itself, an important conclusion.

2.4 Data Analysis

Throughout this section, I document my reflexive process in relation to the six-stage analytical process proposed by Braun and Clarke (2006).

Familiarization with the dataset: This "involves both closeness and familiarity (immersion) and distance (critical reflection)" (Braun and Clarke, 2022, p. 43). After completing interviews, I transcribed the audio recordings verbatim and read each transcript. I made journal entries of thoughts, ideas and emotions encountered. I found it helpful to distinguish between thoughts regarding data interpretation and those about my role in constructing knowledge. Upon re-reading each transcript I began to make notes (as comments within Microsoft Word) about ways in which I was making sense of the data. For each transcript I produced a document summarising overarching thoughts. After re-reading the transcripts I revisited each of the comments and questioned several things including i.) reasons the participants may be making sense of resilience and its development in the way they were ii.) whether they made any assumptions iii.) whether their sense making was consistent with what was considered 'normal' or what I had expected, iv.) whether there were reasons I may be interpreting the data the way I was and v.) whether the data could be interpreted in other ways. In some cases, I wrote possible answers to these questions on the transcripts. I then produced a summary document which included potential patterns across the dataset.

Coding: Coding involves working through the entire dataset and "identifying segments of data that appear potentially interesting, relevant or meaningful for your research question" (Braun and Clarke, 2022, p.35). The systematic nature of coding was a bit daunting to me; perhaps I was afraid of missing a code. I started by adding comments in Microsoft Word. Later, I printed out the transcripts (with comments) for the second and third round of coding. I found that a change in environment and approach helped me to revisit the transcript with 'fresh eyes'. Prior to coding each transcript, I read the corresponding reflexive journal entries. I then began tagging any data that I found interesting or relevant with a code label. As I read through the transcripts, I reminded myself as to whether an existing label already existed. During the first round (particularly the first few transcripts) I typically focused on semantic codes. Code generation initially followed an inductive approach (whilst recognising that pure induction is impossible). As I worked through the transcripts, I began to notice connections with the literature and started coding around theoretical ideas and concepts. I was aware that my positionality influenced what interested me, and that I have my own understanding of resilience within engineering education. I made a conscious effort to separate my personal response to data, from that which was relevant and useful to the overall analysis. Whilst considering my emotive response as an asset, I was mindful that my response would not be the only possible response to the data. A collaborative coding process was used to enhance understanding and interpretation, and to examine the limits of my reflexivity. The aim of this was to question and interrogate my beliefs regarding what I considered important rather than to reach a consensus about data coding. This felt particularly important in the case of data which I had written feeling excited about ('golden quotes').

As I continued coding the interviews, I moved back to make notes on other interviews, particularly when there were similarities and differences. I noticed the first few transcripts were heavily coded, and that not all codes were relevant to the research questions. I continued by making a conscious effort to revisit my research questions. I also felt afraid to code something I knew was unique to one participant. I tried to remember that an individual data item can contribute towards development of a theme.

After coding two or three transcripts I began to feel that I had a good grasp of the data and similar codes were being noted in multiple transcripts. However, I realised that some of my code labels lacked nuance and depth and were being used to capture multiple meanings instead of a singular idea. I was guided by Braun and Clarke's (2013) suggestion that 'good' codes "capture the essence of what it is about that bit of data that interests you and informative enough to capture what was in the data, and your analytic take on it" (p. 210). My codes therefore evolved throughout the process. For example, the original code label 'factor influencing resilience' was parsed out to include information about each factor. I began to feel more confident in my ability to code once I started identifying patterns. There was also a feeling of satisfaction associated with condensing data into a neat set of codes.

I read the transcripts three times, each time in a different order. During the second and third round I sometimes added codes (normally similar to those noted for the later transcripts of the first coding round), and refined code labels. There were between 25 and 45 codes per transcript. The variability in the number made me feel slightly anxious. I tried to remind myself that interviews varied in length, but also that I had been trying hard to ensure coded data was relevant to the research questions and that "some segments of data will not be tagged with any codes, because there isn't anything of relevance to the research question." (Braun and Clarke 2022, p. 53).

All codes were noted within an Excel file alongside a reference to the relevant quote. However, this approach led me to feel as though I was losing context and I later included the relevant quotes within the same document. I then cross checked the codes. In the case that there were similar codes across interviews, I combined the codes ensuring that the nuanced differences were not lost. Finally, I compiled a list of my final codes and the data items associated with each. I ensured that I was able to read the final code labels and understand the nuance of what was meant without looking at the accompanying data. In some cases, this meant adjusting labels. I also checked that, together, my codes captured and reflected the diversity of meaning that I had commented upon within journal entries There were a total of 203 codes.

Generating Initial Themes: This phase involves "identifying shared patterned meaning across the dataset" and compiling "clusters of codes that seem to share a core idea or concept" (Braun and Clarke, 2022, p. 35). Generating themes was the most daunting part of the process to me and I was worried about generating too many, thin themes. When I started this process, I began by trying to copy and paste codes into clusters within the Word document created at the end of the coding process. However, I found this challenging and therefore printed codes out on strips of paper which could be physically moved into clusters.

Upon my first attempt I found I was moving codes into clusters aligned with some of my interview questions, for example factors influencing resilience. Clusters thus appeared to "capture a range of responses around a particular issue" (Braun and Clarke, 2022, p.77) and more similar to topic summaries than themes which have a central organising concept (Braun, Clarke, & Rance, 2014). Braun and Clarke (2022, p.90) warn that this constrains "your ability to notice patterned meaning across the dataset" and prevents "you from exploring pattens or clusters that are not immediately obvious, but that might offer the most useful and important analytic insight". I thus started again, reminding myself of the need to consider whether codes could be grouped in a way such that they all contribute to the same core idea. As I worked through the codes, I explored three clusters I felt relevant to the research questions.

- *'Finding the middle ground'* concentrated on extremes in the way resilience was conceptualised (*"People kept telling me that that wasn't what resilience was."),* and how far educators should push students to develop resilience (*'How far is too far?'*)
- *'Boundaries and limits'* focused on boundaries between the role of the individual and the system in resilience ('*Resilience as highly individual but impacted by the system'*)., and the boundaried nature of educators' roles ('*Limits of the educator*').
- *'Being pulled in different directions'* is about tensions involved in developing resilience.

This is 'work in progress' and effort to develop, review and refine the initial preliminary themes is ongoing. I collected all the unallocated codes into a new Word document for use during theme development which would involve consideration for whether each theme 1.) captured something meaningful, 2.) captured a coherent, central idea and 3.) had clear boundaries (Braun and Clarke, 2022).

3 SUMMARY

The RTA process was both challenging and time consuming. It is recognised that had a different approach been taken (e.g., coding reliability, codebook), themes would still have been generated, but the analysis may have been less interpretive and unrepresentative of the entire data set. Instead, they may have summarised everything said about a certain concept that participants were asked about and be more descriptive in nature. Although the research questions have been partially answered and a preliminary report of findings has been produced, it is recognised that had the analysis been done at a different time and in a different context that it may be different. Indeed, the data and themes (including theme names, subthemes and which codes are included and excluded) may be questioned again when preparing a journal article. This account thus provides an incomplete story and the impossibility of expressing the complexity of the process and the movement between different stages is acknowledged. It is recognized there is no one way to conduct RTA, and that the process reported here is neither correct nor best. However, it is hoped that in sharing this experience, and being transparent about decisions and feelings during RTA, further conversations regarding conceptions of high-quality qualitative EER research are encouraged.

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