

A Non-binary Methodological Manoeuvre: Expert Quantitative and Novice Qualitative Researcher

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INTRODUCTION TO MY MANOEUVRES AND WHERE THAT MIGHT LEAD

It has been said that researchers always have to consider their epistemology, theoretical framework, and methodology when embarking on qualitative research (Crotty, 1998). This does not take into account the individual nature of research, the experiences of the researcher, and the undefined, complex world that we are doing research in where there are competing or changing views. This chapter explores not so much a leap from quantitative to qualitative research, but a merging, or strategic manoeuvring between the two. It shows how lessons learnt from experience can be transferred to a new methodology, and form a bridge between capabilities in quantitative frameworks and the application of those skills to qualitative

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frameworks. This has implications for beginners in any type of research, or experienced researchers changing frameworks, supervising students, working in a multi-disciplinary team, or wanting to consider their outlook on research.

The autoethnographic style of this chapter brings the experiences of the author to the fore (Sparkes, 2000) and is written in a personalised style (Wall, 2006). This autoethnographic reflection provides insights into understanding the transfer from quantitative to qualitative methodologies, and the merging of the two (Bullough & Pinnegar, 2001). The overarching framework is that researchers do not need to be *either* quantitative or qualitative and can utilise skills and experience to see the world in a non-binary way. This will allow researchers to partake in any research, manoeuvre their way through their research career, not feel limited by what they have done before and feel ‘expert’ in, and to transfer the skills to give them an advantage in areas where they feel they are ‘novice’.

FAMILY LIFE, EARLY RESEARCH, AND QUANTITATIVE METHODS

Education in life begins with parents (Bicknell, 2014). I had an upbringing that most would consider academic. My parents were teachers, and I saw them both study university degrees. Even so, they were completely different influences on my life. From the beginning, I was manoeuvring my way through various understandings and different ‘world views’ as my mother would say. The famous Physicist, Richard Feynman (2011), attributes much of his early learning of maths and science to his parents, but also highlights how different his parents were.

My mother was a humanities teacher, and one of her favourite subjects was ‘Integrated Studies’: a mixture of all humanities subjects. It was the epitome of everything qualitative. My father, on the other hand, was technical and practical as a Manual Arts and Graphics teacher. He taught me everything about numbers, measurements, calculating, drawing, and building. This was the epitome of everything quantitative.

One conceptualisation, however, that my mother and ‘Integrated Studies’ taught me was to have a holistic world view. I was never taught that the social ‘way of seeing’ and mathematical ‘way of seeing’ would be anything other than congruous, so I grew up totally immersed in everything. Even in senior school, I did science subjects and Modern History just for interest. I was quite the ‘geek’ and also read *The Turning Point*

by Fritjof Capra (1983) and its impact is significant to this day. I was not like either of my parents, but rather like both of my parents, a non-binary, holistic mix.

When I was in high school, my mother was finishing her Master of Education and when I was studying for my Bachelor of Science, she completed her PhD in Medical Education. By this stage, I was totally engrossed in my Science degree, and deeply passionate about all things physics, and so when she suggested I read her thesis, I said I would one day.

My undergraduate programme was in a very quantitative environment. I had to complete experiments to prove theories, and later was given a set of equipment and an idea and then form a hypothesis, design the experiment, collect the data, and hence prove the theory. My Honours thesis required me to prove experimentally that solid state phase transformation in microscopic stones trapped in window glass could crack a 2 x 2 metre window and bring it down on pedestrians from high-rise buildings (Barry & Ford, 2001).

Despite all of that, however, it is very interesting how non-specific physics actually is (Hoffman, 2013; Solov'ev, 2012) especially the human understanding of it (Smith & Vul, 2013). It really does help to have a world view that is not strictly positivistic, or needing to define everything precisely quantitatively. I was very comfortable with this, thanks to the holistic influences of my parents.

A particular extreme paradox of this ambiguity that physicists accept is the famous thought experiment of Schrödinger's cat (Gribbin, 1991). Put a cat in a box with a radioactive substance and a bottle of poison. The radioactive substance has a 50 % chance of decaying at any time in one hour. If it decays, this releases the poison which kills the cat. The most interesting thing about this experiment is that underlying physics says that in a radioactive atom, if it is not observed, or looked at, then the atom has BOTH decayed and not decayed at the *same time*. There is even a mathematical formula for this effect. If the atom is both decayed AND not decayed, then the cat is both alive AND dead. It is only when the box is opened and the situation observed that the wave equation collapses to a singularity and we find whether the cat is indeed alive or dead, but for one hour, the cat is both alive AND dead.

Ultimately my PhD from 2002 to 2006 was the epitome of quantitative research with an extremely deep, technical focus to extensively 'prove' just one single, major theory, with valid, reliable, and statistically significant results. Overall, I had approximately ten years being immersed in 'hard-core' quantitative research methods.

THE SHIFT TO QUALITATIVE RESEARCH

When I was first ‘officially’ introduced to qualitative research, I was not interested, and I did not need it on the path that I was following. I was reminded of my mother’s research degrees where she talked about qualitative research, and had so many journal articles around the house and it all just seemed too much reading and all too wordy.

During my PhD, however, I began to have a lot to do with an Engineering Education research centre that was multi-disciplinary. This had a subtle influence on my thinking. Many of these people also had an Engineering background, but talking to anthropologists, sociologists, and educationalists, made me realise that this ‘human’ side of research was also important. In the end, are we not engineering technology for human use?

Going to Purdue University and undertaking post-doctoral research in Engineering Education for a year in 2007 helped me to begin to explore ‘non-quantitative’ research. I was alerted to the need for a theoretical framework by Karl Smith (Redish & Smith, 2008), when I attempted to submit a paper to the Journal of Engineering Education, but had no idea where to begin. I heard of such things as Grounded Theory Methodology (Strauss & Corbin, 1998), Vygotsky’s Zone of Proximal Development (Doolittle, 1995), and Kolb’s Experiential Learning Cycle Model (Kolb, 1976). We did interviews and what we called coding and categorisation. How it all worked, however, was never consolidated in my mind. Besides, I was going home and did not think I would continue with that.

MAJOR SHIFT TO QUALITATIVE RESEARCH IN MASTER OF EDUCATION

Here I am, six years later and a year into my Master of Education, grappling with qualitative research. I have an edge, however, over novices who are trying to come to terms with research as a completely new experience because I am an experienced researcher, even though it was in quantitative research. New researchers have to learn how to do research, the basics, the philosophy, the process, how to reconcile theoretical underpinnings with the experimental process, and so forth (Krassen Covan, 2010).

While the research design process is extremely different between quantitative and qualitative research (Marshall & Rossman, 2011), bringing research experience with me and already having a deep appreciation of academia does bring a level of confidence to my qualitative research

(McAlpine & Amundsen, 2009). As such the manoeuvre from quantitative to qualitative research is not particularly risky from my point of view (Harreveld, 2004). I see it less as a contradictory dichotomy (Creswell, 2008) and rather more as a non-binary state. I am both a quantitative AND qualitative researcher, both an experienced AND a novice researcher.

The construction ‘Binary’, although not necessarily named as such, is also often applied to many areas of life. Mathematics and computing base entire logic systems on the fact that things are either on (1) or off (0) giving the binary numeric system (Price, 1969). Biology classifies living things into species where one organism must exist only as one species (Reece et al., 2014), or gender as male or female (Lorber, 1996). The binary is also seen in the social world where people are expected to see things one way or all the other: being pro-gun or anti-gun, pro-life or pro-choice. It is reasonable that this binary has been seen in the research world where a researcher is described as either quantitative or qualitative, but is not always accurate. How can one person be both expert and novice?

It is an awkward situation, but one that offers opportunity by taking my skills into consideration. I find myself adept at finding journal articles, if only I know what terms to use for the search. I know how to formulate an argument and use literature to support it, but I do not know quite enough words yet to make a story. I feel like I need a lot of advice, but only to get started and then I can run with that.

TRANSFERABLE SKILLS: THINGS I FOUND EASY

Being in a non-binary state of expert and novice, mean there are skills that are transferable (Cargill, 2004). There are challenges, but being open to more than one point of view is where I feel I have an advantage in overcoming those challenges (Snyder & Snyder, 2008).

The main element I learnt when beginning qualitative research after being immersed in quantitative research is that taking the binary blinkers off allowed me to see that I did not need to forget who I was as a quantitative researcher in order to become a qualitative researcher. In fact, many people were telling me the skills I needed to know in order to do qualitative research—implying that they would not be things that I needed in quantitative research—and I found that I already knew these. I just had not recognised that my skills would overlap. From practical to analytical, and in particular methodological perspectives, it surprised both my supervisors and me to find the following five transferable skills.

1. Time Commitment

When I commenced my Master's, I was prepared for it to take a fair amount of time. I had always been good at making time for study and knew it needed concentration and cognitive application. Ever since I was at school, I would spend hours studying and deliberating over challenging concepts until they consolidated in my mind. The PhD also required a lot of time at each step of the process. Predominantly, something often not seen as particularly true of quantitative research was the long and arduous literature review. This meant long hours reading and writing and effort in comprehension.

I was enrolled in the PhD full-time, and had an office at the university, so this made it easy to learn routine and what suited me in terms of the length of time I could put in before I needed a break. Now I realise that I do not need to be in an office at work, but I can also set myself up in a similar manner at home, without any distractions, and I find I am disciplined enough to put in the hours necessary on any given day.

Any research methodology will take time for it to be thorough, comprehensive, and rigorous, and as such this is something that is not specific to either quantitative or qualitative research.

2. Long-Term Commitment

The PhD also prepared me for the long-term nature of the commitment; that research is a drawn out process, and it is impossible to see the whole picture from the beginning. Luckily, I am slightly more of a sequential thinker, not a global thinker. This helps at times when the big picture is difficult to see. I am not blocked by this, and can take the next step, whether it be read another paper, look over data in a different way, or do something practical such as another experiment or transcribe an interview. No matter if it is quantitative or qualitative research, having this flexibility can keep motivation through such a long journey.

The long-term nature also means that at times the trajectory will change. Whether in the quantitative field or qualitative realm, I find that I write down some research questions, and then over time as I read and collect data I expect that the focus will change. This is normal, and acceptable (Silverman, 1993). Despite the changes, however, what I have learnt is to keep going, stay committed, and that it is all part of a productive process.

I have conversations with my supervisors about the chapters that my thesis will need to cover and I realise how much I have to do. I am less

daunted, however, having been through this process before. I know that it will all come together in the end. Whether in a quantitative, number-driven environment, or in a qualitative, conceptual environment I have learnt that concentrating on one thing at a time is key for me to get through.

3. Taking Notes

Throughout my PhD, I was always reading and interpreting journal articles and papers. It was not enough to simply read something and put that away in a filing cabinet. I had to read for meaning (Roberts & Roberts, 2008) and extract the information for my current study. I had to write ideas down along with the connotations, limitations, and implications. While this is what note-taking, or note-making is all about, and is a skill required for all study (Coman & Heavers, 1991), it is different with the volumes required for such a large project and is something in which I have become proficient.

It is the same with the articles I am reading at the moment. I cannot simply read them and think that I have digested the knowledge. I still need to understand the relevance for the current study, extract the meaningful information, and physically write it down in my own words (Fisk & Hurst, 2003). The higher-order interpretation and consolidation skills required for research means that note-making is taken to a new level—one required in both quantitative and qualitative study.

4. Critical Review and Context

In reading and distilling meaning from documents, I developed the ability to critically review information. In contrast to some anecdotal beliefs, I have heard about quantitative research, I had to look at the context of the study, who the researchers were, why they were doing the research, and what their backgrounds were. Similarly, I need to do this as a qualitative researcher now to see how what I am reading fits with everything else. Reading critically is especially essential where there are conflicting viewpoints. Even in quantitative studies there can be a huge variety of outcomes depending on all of the variables, and it takes just as much effort to interpret these results in the context of the literature as qualitative outcomes.

In quantitative, positivistic, scientific world, it is ‘expected’ that results will be valid and reliable, repeatable, and mathematically or statistically

‘provable’, (Karsai & Kamps, 2010) and so to come up with completely different results requires intensive critical analysis and argument. Quite often in a scientific study, there is not such an emphasis on critiquing the actual methods of previous researchers as in qualitative research, and it is more about confirming or disputing the results.

In my PhD work, researchers from different industries expected certain ways of doing things. Just because there is a mathematical relationship between certain experimental outcomes, does not mean I did not have to investigate the premises that the mathematical relationship was built on. I had to go back to first principles and definitions for that particular field. Now I have to go back to definitions but ones related to qualitative research.

5. The Importance of the Right Method

In my earlier quantitative research, I had to carefully investigate the method in all of the studies that I read about. In science, there are different ways of doing the same experiment and that can give different results meaning that an expected ‘theory’ may not be achieved. The exact way of measuring the strength in magnesium has to be very different from the industry standard used in steel because the metals have drastically different deformation mechanisms. My work on magnesium required a whole different method, and the argument about this was taken all the way to Standards Australia to have the AS 1391–2007 updated (from the 1991 to the 2005 edition).

The method was the critical point as to the acceptance of the end results, rather than the results on their own. This kind of evaluation is usually considered the domain of qualitative research where the methodology is the arguable variable, and so long as the methodology is accepted, then the results are accepted. Usually in quantitative research, the method is set and the results should match everything that has been before and ever will be again.

I have come to see that I was one of the lucky ones in my quantitative experience. Quite often in a scientific study, there is not such an emphasis on critiquing the methods and theoretical foundations of previous researchers. This, I would have to say, is the most significant and advantageous skill that being an expert researcher has brought to my new-found manoeuvring towards, and immersion in qualitative research.

CHALLENGES: THINGS I FOUND HARD AND HOW BEING NON-BINARY HELPED

Despite many similarities, there were also a few challenges. Two of the major ones are as follows:

1. The Words and Sentences

Although I had touched on some of the elements of Grounded Theory and coding in my Postdoctoral position, I did not have to come to terms with reading articles on these methods. I was not formally inducted to the theory. I was in a research group that had been doing this study for a year, and I was told to code data. Now to read the words and even comprehend one sentence is a major challenge. The first paper I read for this Master's I needed to read each sentence many times over, sit back and think about it, and then re-read the sentence. This was a familiar situation to me, from my quantitative study, including my PhD. There were always words I did not know and I knew that eventually it would be easier. It is just an extremely different way of writing from the fact-based style of quantitative articles.

2. Digesting the Content

Understanding the content also required much effort. I found myself falling very short on the meanings of the technical terms. For example, even the relatively simple 'methodological framework' along with more complex notions such as 'epistemology', 'ontology', 'ethnomethodology', and 'pragmatist philosophy' were all alien concepts.

My PhD research taught me to go with the flow, follow-up, and trust that eventually it would make sense. I had to deal with some complex concepts in the physical world too, including the energy functions of atoms. I accept that these are concepts that I will learn, so write them down and as I read, I slowly develop a deeper understanding. Even issues that I should have been familiar with from quantitative research, like 'validity', 'reliability' (Malterud, 2001), and evidence (Xu & Storr, 2012) suddenly became new concepts that had completely different connotations. Other concepts that I thought I had a hold of like 'induction' and 'deduction' suddenly became obscure, plus the completely new 'abduction' (Bryant & Charmaz, 2010)!

Learning about the methodologies was complicated but in the end rewarding (Cooper, Fleischer, & Cotton, 2012). I needed to learn the subtle nuances of a particular methodology and that required a considerable effort. I knew, however, that I could accept these and wade through the arguments around any particular methodology and be discerning in my reading as I had been through that sort of process in quantitative research.

In the end, I found myself in a sort of blurred state, and I make the link with being in a non-binary state. For each challenge, it was a case of remembering the experience and how I dealt with it, rather than panic because this is something new and difficult. I had to lose focus on the purely qualitative research thought process and blend it with the world of quantitative thought processes and be in both head spaces at the same time. I needed to ignore the stereotypes of each methodology and exist in the unstable state until it all worked out. Unbeknownst to me, this state of mind and immersion in the blurriness would later become useful in the analysis stage of using grounded theory methodology with the memo making and categorisation (Lempert, 2010). Physics had even taught me to blur the lines as my first assignment in my first ever university course was to investigate Bose–Einstein condensation (Collins, 1995) where atoms at incredibly low temperatures will become indistinguishable from each other. This time around I can accept that both quantitative and qualitative can exist in the same frame of reference.

BRINGING IT ALL TOGETHER

As a result of my research journey, the concepts of labels have become important. Many people do not like labels as it defines them too much into being a single thing—obviously, against the non-binary, multiplistic idea that I am trying to emphasise here. While much work has been done with labels in the fields of disability, sexuality, and gender, I have certainly found it can also apply to being a researcher. For a while I have had a problem with both labels and the *lack* of labels. I know that labels can be seen as limiting, and as always, it is not just black or white. Big, small, gay, straight, male, female, up, down, fat, thin, and so on, there are always examples of people or things that do not fit just into one end of the category. So do we do away with labels altogether? Should there be no label ‘male’ and no label ‘female’ because some people feel they are not either of these and others feel that they are both of these at the same time? What

then happens to people who want to identify as male or female? I know this seems like a linguistic argument, but really the underpinnings of this are that labels are necessary. Without labels we cannot associate things and we cannot find similarities. We do not need to rule out *other* labels or characteristics that maybe typically would be seen as incongruent with that particular label.

I have read many articles where the authors have defined themselves either explicitly or implicitly through their research arguments as *either* a quantitative researcher, or qualitative researcher, or as either positivist or constructivist. Does that mean that we have to assume that in everything they do they are that way inclined? Or that they will remain that way over time? Or even that they are not indeed both at the same time? We see but a small snippet of their work where they label themselves, or we can apply the label, quantitative or qualitative, constructivist or positivist. We need the label to understand what they are doing at that point in time, or in that particular study, so we can identify what we already know about that facet and they do not need to describe it again (or papers would become unnecessarily lengthy).

In grounded theory methodology, the concept of categorisation is immensely impacted by this discussion around labels, and binary or non-binary models. Dey gives a very good analysis of this (Dey, 2010), and relates it to biology and the classification of plants and other organisms. His work also discusses people, concepts, ideas, actions, and words not fitting into mutually exclusive categories, and that there are many different ways we can 'label' and hence categorise things.

It does not have to be one way or the other. I am not just talking about mixed methods either. This is deep seated, epistemological views of the world, and part of oneself as a researcher (Werner & Rogers, 2013). Can a researcher have different epistemologies? If a researcher is human, then yes, different epistemological view points, and indeed different methodologies can be used in different settings (Candy, 1991). It is possible to not only be two things, but hundreds all at once (Beckham, 2014).

It is not even a spectrum. We are multidimensional humans. If it was just on a spectrum and nothing else, there is no duality, no non-binary, there is simply in the middle. There is simply half one way and half the other way, rather than ALL of BOTH. The problem with the spectrum and potentially being in the middle is that it implies that you have to lose some of one end to gain some of the other end. To be in the middle means a bit like you sit on the fence, or are undecided, and my argument is that this does not need to be the case.

There is a physics phenomenon that also illustrates how something can be two things at once. It is called ‘wave-particle duality’ (Hendry, 1980). We know waves can be made in any pool of liquid. Particles, on the other hand, are like billiard balls on a table, bouncing very predictably. So they seem very different. Elementary, subatomic particles, however, are BOTH waves and particles at the same time. They travel like waves as if they were one continuous fluid, but also bounce off one another as if they were individual solid balls. It was not difficult for physicists to accept they are both waves and particles, because they regularly deal with infinity, time speeding up and slowing down, and other concepts.

CONCLUSION: WHERE TO FROM HERE

My story has illustrated that it is possible to go from being a quantitative researcher to being a qualitative researcher. It has also shown that being an experienced researcher even in an extremely different field can make the journey easier if one is open to transferring the skills and knowledge, and using past experiences to overcome challenges.

It is intriguing to see that it is not limited to the realm of the qualitative world and constructed knowledge or socially meaningful labels that we find uncertainty, blurred lines, and the non-binary nature of life, but also in the traditionally positivistic world of the physical sciences. Perhaps quantitative and qualitative research are not so different after all, and that people in each field cannot assume certain characteristics of the other methodology without first taking the plunge and doing a bit of methodological manoeuvring themselves.

There is no linear journey; no binary scale in becoming or being a researcher, epistemologically or methodologically speaking. It is really up to the individual to utilise their expertise, understand their own skills and embrace their own non-binary, non-specific, blurry situation, and be open-minded about the possibilities, no matter what black hole or time-warp it may take you through.

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