

Navigating the Path Between Positivism and Interpretivism for the Technology Academic Completing Education Research

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INTRODUCTION

Research is a complex endeavour. Whether we are talking about scientific work with chemicals, technology work with computers or education work with students, the parameters of a research design are a complicated set of variables that must be uniquely set for each research project. Whilst it could be argued that the purpose of all research is the same in its quest for knowledge and answers to unanswered questions, the variations in these questions can be quite wide, leading towards significantly different research design depending on the discipline (Bryman, [2012](#)).

Many universities seek to address this by teaching students about the more popular research methodologies within their discipline but, by its very nature, this leads to a discipline-focused understanding of research design by a particular researcher. In short, whilst this research has the same

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process, the experience of that process by each individual researcher will be different, with their resulting understanding of research design influenced by their discipline background.

Against this context of differing discipline-focused research design we have the situation of a researcher looking to change their research focus. The movement of researchers from a traditional quantitative model to a qualitative model would suggest a much broader focus on research design. In particular, in my case, as a technology researcher looking to the field of education, I find myself confronting challenges to a taken-for-granted mindset regarding epistemology, leading to a change in the other facets of their research design. How best can I deal with this change when my existing mindset regarding research design is so discipline focused and quantitative in nature?

This chapter will discuss my own experience as a researcher in the field of information and communication technology, a field typically steeped in experimentation, working through the methodological manoeuvring required to contribute to qualitative research in learning and teaching. Building on the work of Chinn, Buckland and Samarapungavan (2011), who argue that epistemological perceptions must be broadened to help with cognition, this chapter will break apart my original epistemology as a technology academic, explaining the components of this positivist epistemology. This will include how it was communicated to researchers completing research in technology during the author's PhD, focusing in particular on how epistemology in this discipline was downplayed in favour of discussion of methods and taken-for-granted methodology.

A bridge will then be established between this common epistemology of technology researchers and the epistemology of qualitative learning and teaching researchers. This presents a contrast to the work of Sinatra and Chinn (2012), who looked at the enhancement of scientific reasoning in students as a form of conceptual change, instead looking at how technology researchers could implement social science concepts. Specifically, the use of positivist epistemology in learning and teaching research will be explored using my own work as a case study, along with methods for researchers to interpret other paradigms such as interpretivism. Finally, using work such as that by Hofer and Bendixen (2012) on "personal epistemology", the position of different epistemologies and their relationships to research questions will be discussed, with strategies identified to allow researchers coming from technology research to navigate an epistemological shift for learning and teaching research and discussion on why this might be required.

The purpose of this chapter is to serve as a mechanism to allow interrogation of the methodologies and epistemologies used in these disciplines and to show how methodological manoeuvring might be conceptualised and completed by technology researchers endeavouring to complete research into learning and teaching, using the research journey of the author as a case study. As a case study of one, examples from my own journey as the author will be discussed, particularly focusing on the specifics of how I completed a transformative learning journey, allowing me to view the world through a different lens. Through this, others are encouraged to assess their own epistemology and how it fits with the research, they do.

THINKING: HOW WE INTERPRET THE WORLD

There are many different ways to think about research design. This book provides examples of those different approaches, and how varied they can be. Broadly speaking, many researchers refer to research as being either “quantitative” or “qualitative”, with the newer “mixed methods” work integrating these two approaches to have a combined quantitative/qualitative study with multiple phases (Bryman, 2012). For some technology researchers, including myself, this reference to either qualitative or quantitative was the extent of the knowledge imparted about research design, with an automatic assumption that the researcher would be conducting an experimental quantitative study and so no more detail was required on the broader topics of research design.

However, I would now argue that the world of research design is actually much richer than this simple quantitative/qualitative distinction. Michael Crotty presents a model that is influential in the field. Whilst many researchers define the various parts of a research design in different ways, there is also a certain simplicity to the model described by Crotty (1998). Crotty (1998) breaks research down into four interconnected elements:

- Epistemology—The theory of knowledge
- Theoretical Perspective—The philosophical stance
- Methodology—The plan of action
- Methods—The techniques employed

Each of these elements contributes to the next, so that a researcher with a clear methodology should be able to trace backwards to a corresponding theoretical perspective and epistemology. Similarly, a researcher with a clear epistemology will be able to select an appropriate theoretical perspective

Table 4.1 Examples of different types of research

<i>Epistemology</i>	<i>Theoretical perspective</i>	<i>Methodology</i>	<i>Methods</i>
Objectivism Constructionism Subjectivism (<i>and their variants</i>)	Positivism (and post-positivism) Interpretivism <ul style="list-style-type: none">• Symbolic interactionism• Phenomenology• Hermeneutics Critical inquiry Feminism Postmodernism etc.	Experimental research Survey research Ethnography Phenomenological research Grounded theory Heuristic inquiry Heuristic inquiry Action research Discourse analysis Feminist standpoint research etc.	Sampling Measurement and scaling Questionnaire Observation <ul style="list-style-type: none">• Participant• Non-participant Interview Focus group Cases study Life history Narrative Visual ethnographic methods Statistical analysis Data reduction Theme identification Comparative analysis Cognitive mapping Interpretative methods Document analysis Content analysis Conversation analysis etc.

Source: Crotty (1998)

and methodology. One of the key tenets of the work by Crotty (1998) is that this connection between the elements clearly exists, in that a path can be mapped between a particular item in any of the four elements and a corresponding item in the other elements.

As noted above, there are differences in the use of terminology depending on the source. However, whilst these different elements can often have different labels, Crotty’s (1998) model serves as a useful approach to looking at social research methods. In particular, Crotty (1998) provides details of various items within each of the elements that help to unpack a researchers thinking (Table 4.1).

Arguably, the most important of these is epistemology, which Crotty (1998, p. 3) defines as “the theory of knowledge embedded in the theoretical perspective and thereby in the methodology”. Epistemology is important because it influences the question: “What kind of knowledge do we believe will be attained by our research?” (Crotty, 1998, p. 2). Different epistemologies lead to different theoretical perspectives, methodologies, methods and so on.

Using Crotty’s (1998) outline, by using a different epistemological lens to look at the world, enables a choice of a different methodology, which in turn requires a different theoretical perspective. Experimental research suggests a positivist theoretical perspective and an objectivist epistemology; however, research using (say) grounded theory will mean a symbolic interpretivist theoretical perspective is required, aligning to a constructionism epistemology. This means a change in thinking, a shift for the researcher in terms of not only methodology, but also a challenge to their internal theory of knowledge.

Considering the two theoretical perspectives noted in the title specifically, Crotty (1998) defines positivism as “The March of Science”, noting that it offers “assurance of unambiguous and accurate knowledge of the world” (p. 18). He provides a history of the term growing out of the use of the term “posit”, meaning to position something as fact. Finally, he links the term very clearly to science, noting that positivists are “great lovers of science” and that the world addressed by positivism is not the real world but, instead, the scientific world steeped in objectivity, validity and generalisability. Put another way, the text is arguing that for positivists there is only one way to see the world, the “factual” way (as they see it), a literal truth that is not affected by interpretation.

In contrast, with regard to interpretivism, the approach put forward by Crotty (1998) is to build a case for interpretivism as a theoretical perspective steeped in culture, contrasting the natural science approach to “explaining” with the social science needed for “understanding” and working towards an understanding that there is a perceived fundamental difference in the subject matter of social science and natural science research (Crotty, 1998).

On the basis of this case, Crotty (1998) describes Symbolic Interactionism as a historical stream that has “borne [interpretivism] along” (Crotty, 1998, p. 71). Quoting the work of George Mead, Crotty (1998) builds the case that symbolic interactionism postulates that we “owe to society our very being as conscious and self-conscious entities, for that being arises from a process of symbolic interaction” (p. 74). He then links this theoretical

perspective (in Crotty parlance) with the broader epistemology of constructionism, which is the view that objects do not have meaning of their own (as in objectivism) but instead are assigned meaning contingent on human practice and in their interaction with us as human beings.

Put another way, the text is arguing that an individual is made up of their experiences and, further, that to truly understand an individual we must put ourselves in their place and understand that the symbols with which they have interacted with to become who they are, as well as relating to rituals, culture and language as certain kinds of symbols. In this way, Crotty (1998) indicates that symbolic interactionism can share close ties with an ethnographic methodology.

Finally, Crotty (1998) also notes that the approach to developing an epistemology can often be different, depending on the research training received. He notes that for those studying “quantitative” methods, the thought process often starts with method, working backwards to derive an epistemology that grows out of the methods that these researchers are trained to use. In contrast, those investigating a “qualitative” method often start with epistemology or theoretical framework, working downwards from these elements to determine a methodology and method out of the overarching framework.

As noted, this has presented quite a challenge for me in my own personal journey as I moved from Technology to Education. Coming from a predominantly quantitative background, I had to begin to understand this model of a more complex research design, and a more complex view of the world. More interestingly, I have had to realise that a more complex view actually existed, as my training prior to my discipline change did not even recognise that this different design existed! In fact, when I first started my career as a researcher, I was focused solely on a positivist approach, although I did not know it at the time. The next section discusses this in more detail.

TECHNOLOGY AND THE POSITIVIST EPISTEMOLOGY

As noted above, if we take the position that technology researchers work with quantitative data and methods, then it is possible to use Crotty (1998) to work backwards to determine and track a methodology, theoretical framework and epistemological position. For example, when I completed my PhD in Information Technology, I used a sampling and measurement method, which suggests an experimental methodology, a positivist theoretical perspective and, finally, an objectivist epistemology.

However, the more interesting part of this case study is not the epistemology I used, but, rather, the ease with which I accepted that epistemology (and related components) as the only way to do research in my discipline. Using textbooks such as *Introduction to Business Statistics* by Weiers and *The Basic Practice of Statistics* by Moore (Weiers, 2008; Moore, 2004), we were taught the basics of statistics and statistical methods, but very little on the choice of methodology we would use, or the overarching epistemology. This suggests that statistical methods were seen as the only legitimate way of knowing the world and presenting “good” research.

Rather than being asked to select an epistemology and theoretical framework and then apply a method (as per Crotty [1998]), the assumption appeared to be made that we would all use the same methodology and that only the details of the data analysis needed to be learned. This set me up well for the work I was doing, which was predominantly experimental and very quantitative, but provided very little methodological grounding. In fact, a review of the journal paper I published during my doctorate shows a very short methodology section focused solely on the parameters of the experiment and not at all on the methodology (Cowling & Sitte, 2003). While this put me in a good position to complete my doctoral studies, it left me with a very narrow view of research design and a doctorate that, whilst good for quantitative research, had limitations for qualitative work, something that would only become apparent to me almost ten years later as I moved from one discipline to another.

TAKING THE POSITIVIST TO EDUCATION

It is clear from a review of the literature that social research methods require a deeper and more nuanced understanding of research than the approach typically followed in a more experimental field, where the overarching motivations and positions for the work are assumed and subsumed in favour of the importance of the experiment (Bryman, 2012). Rather, to interact with society, it seems important to have an understanding not only of the work to be conducted, but also the rationale for the work and the motivation behind it, including an understanding of how the researcher views the world. Here, the focus of the research is on understanding the interaction of human behaviour, rather than following an experimental design to test a hypothesis.

Despite this, it would be wrong to assume that all technology work is positivist, or that all education work is interpretivist. For instance,

positivist work exists in the education field, especially from researchers with a background in “quantitative” research (see, for example, Muijs, 2010). Similarly, in the area of information systems (a sub-discipline of the broader Information & Communication Technology discipline), researchers have completed non-positivist studies (Myers, 2015). Yet despite this, based on my experience, it would not be unreasonable to suggest that for many technology researchers, quantitative research is the norm and qualitative research is unusual. This is because in certain disciplines, quantitative research approaches are seen as the legitimate approach and other types of approaches can be labelled as subjective and not “true” research.

Also not surprisingly, my own experience was definitely along these lines. Moving from an experimental PhD, I found myself taking a greater interest in learning and teaching and the process of educating students. After some time focused solely on teaching, I wanted to answer certain questions that were emerging from my own practice as an educator. I wanted to know how to better engage with students, and how engagement and attendance (for instance) were linked. However, as I started to venture down this path, I maintained a particular approach to how I might investigate these questions.

My first publication in the education space was a conference paper looking at how attendance and engagement were correlated (Cowling, 2012). Rather than interviewing students or taking a survey, I fell back on my research training and decided to look at data relating to the attendance of the students. Using Excel and other statistical modelling tools, I sought to analyse correlations and cross-tabulations in the data, using this to make my conclusions. The paper was well received, especially by the Dean of Business and Informatics at the time, who had a background as a statistician. But my research did not look to the core of the issue, but rather, it looked at a pattern among the numbers to explain student motivation, which influenced the conclusions I was able to draw.

My second attempt to move into this space was with a colleague, looking at the use of Twitter as a mechanism to increase feedback in the classroom (Cowling & Novak, 2012). By this stage, I was starting to realise that pedagogy was more important than technology, so the project was initially driven by a desire to increase feedback from “shy” students and then bolster their feedback with the technology (in this case Twitter). Although we conducted a survey with all students, the way the data was analysed was predominantly statistical, with reporting on the percentages for each student on each question and very few open-ended rich

qualitative questions. And again, although the results were interesting, we were struggling to get to the underlying motivations of the students.

Upon completion of this project I felt I had made a contribution to knowledge, but had not really reached the core of what actually made students want to use technology in the classroom. It was at this stage that I finally realised that perhaps I was not asking the right questions. My research knowledge was more limited than I realised, and if I was going to make a contribution in this space I would have to broaden my knowledge so I could really start to consider student motivation and other factors. This is consistent with the transformative learning theory as described by Cranton (2002), which discusses how an event (such as my completion of the Twitter project) can show an individual that they hold a limited or distorted view. Through the application of what Cranton (2002) outlines as emancipatory knowledge, this event allows the individual to critically analyse their views and potentially transform how they make meaning of the world. The next section discusses this critical event and the ramifications to my work.

EDUCATING THE TECHNOLOGIST ABOUT EPISTEMOLOGY

Unfortunately, pursuing a positivist approach for education research can only take a researcher so far. I discovered this in my own work after several attempts to apply a positivist approach to education technology work, but subsequently found that I was not getting to heart of the real questions I wanted to ask. This is because if the research approach involves individuals and qualitative data, then the methodology has to change, resulting in a change to the basic epistemology used. For instance, if grounded theory is used as a methodology, then Crotty (1998) suggests that theory is more appropriately placed in the broader concept of interpretivism, specifically symbolic interactionism. He then links this theoretical perspective (in Crotty parlance) with the broader epistemology of constructionism, which is the view that objects do not have meaning on their own (as in objectivism) but instead are assigned meaning contingent on human practice and in their interaction with us as human beings. This is in stark contrast to my previously positivist leanings and quite a change in “head space”.

The critical event that occurred for me, in line with the work by Cranton (2002) on transformative learning theory, was the realisation that I needed to make the change outlined above, understanding that my epistemology was just one of many and that there were other views of the world. I quickly realised that this would require analysis of not only my own epistemology,

but also how that linked to the other facets of the Crotty (1998) model that I was using (theoretical perspective, methodology, method) to answer my research questions. I decided that I would investigate interpretivism as a mechanism to widen my epistemology and hence my theoretical perspective and other aspects. This is supported in the literature, with Chinn et al. (2011) arguing that epistemological perceptions must be broadened to help with cognition. In fact, looking at the literature, the use of interpretivism appears to be a common way to approach research design in education and educational technology (O'donoghue, 2006).

Through this new understanding of a different view on research design, I was able to approach my research questions with a new lens. Rather than looking to analyse data, I was able to take a more nuanced approach to how students experienced technology in the classroom and how their thoughts and feelings with technology might affect their acceptance of it, especially as they relate to the ability of the technology to become a part of the classroom rather than a “bolt on”.

The beginnings of this change in epistemology can be seen in papers I published after this critical event, such as the paper I wrote at the end of 2014 that looked at models for the integration of social networking into the fabric of the classroom (Cowling, 2014). However, other work I was involved in continued to be dominated by the positivist approach. Working with colleagues, or with PhD students, or simply on existing projects, I found that my newfound epistemology could not always apply, and that I was instead forced to adopt a positivist approach.

And I found that, rather than being distressed by this, I was excited, because in some cases positivist work was more appropriate, and I was still steeped in this epistemology, despite the changes that my journey had wrought. So, in what could be framed as a second critical event, I began to ask myself, was Crotty (1998) perhaps too narrow and was it possible to have a wider, multi-epistemological view of the world, depending on the research question being asked? The following section discusses this final critical question in more detail.

DEVELOPING A MORE COMPREHENSIVE PERSONAL EPISTEMOLOGY

Crotty (1998) defines epistemology as your own personal theory of knowledge. Extending from this definition, it is perhaps reasonable to assume that each person can only have a single viewpoint on this theory. Through my journey, however, I discovered that it was possible to have multiple

viewpoints depending on the situation, with my position in life now supporting both a positivist viewpoint as well as an interpretivist viewpoint, depending on the research that I was doing.

There are comments in the literature that support this idea of multiple viewpoints. Hofer and Bendixen (2012) argue for a personal epistemology that places each individual on a spectrum, choosing from a range of different ideas to fit them into a space as more positivist or interpretivist. However, the work by Hofer and Bendixen (2012) suggests that this spectrum is immutable and that a personal epistemology is unlikely to change, a fact that my own experience disputes. Similarly, work by Muis, Bendixen and Haerle (2006) outlines the domain specific and domain general epistemologies for different disciplines, using empirical studies as a guide. However, it also assumes that these domains are immutable and that a particular discipline will always have a particular epistemology and that researchers within that area will maintain a consistent (and myopic) set of beliefs.

Having said this, there is work in the literature that suggests that change is possible, even if that change is a one-time event. For instance, work by Howard, McGee, Schwartz and Purcell (2000) looked at how the epistemology of teachers could be changed through the application of constructivist training techniques to allow a great appreciation of the use of ICT. And work by Pintrich, Marx and Boyle (1993) represents an example of a body of work that looks at a one-time conceptual change in students as a result of the study process. However, in both cases, this change is not represented to be fluid, but, instead, a work of time and context that is then irreversible.

Rather, using this work on personal epistemology as a guide, combined with my own experience, I have come to the conclusion that a single viewpoint of epistemology may not be appropriate. This is because different research asks different questions—and so requires different theories of knowledge and different types of thinking. Rather than having a single epistemology, or a single chance to change epistemologies throughout their lifetime (moving along the spectrum outlined by Hofer and Bendixen [2012]), a researcher should perhaps instead have a selection of different epistemologies depending on the research question that they wish to answer.

Of course, this can be hard work—I originally ventured into the technology field because I have a leaning towards the view that everything is scientific and determined by objects (positivism). However, if I wish to

investigate questions outside of this worldview, then I need to acknowledge that Education and exploring my area requires a shift—towards recognising that the way of the world is determined by the way we look at it (interpretivism). It is only by making this shift that I can answer the research questions that I need to answer as an educational technologist.

Perhaps my experience demonstrates that the original model by Crotty (1998) needs to be extended. Whilst the key components can remain, it should be acknowledged that there is a spectrum of epistemologies from which a researcher can draw, and that attaching oneself to one epistemology does not necessarily remove one from pursuing other epistemologies, depending on the research question that is being asked. Rather than a myopic view, perhaps the Crotty (1998) table should be seen as a toolbox from which researchers can select different epistemologies (and hence frameworks, methodologies and methods) as they seek to answer different questions, potentially arising from different disciplines. The key then becomes to equip researchers with these tools through careful training, alerting them to the toolbox that is available rather than slotting them into a particular epistemology based on their discipline. For my own work, this would have made the transition described above much smoother, as I moved from a technology researcher to an education researcher.

CONCLUSION

Research is a complex endeavour. Regardless of the work that we are doing, the design of your research and the choice of questions you answer can be complex. Even worse, my own personal case demonstrates that, whilst a researcher can become an expert in their field, this does not mean that they have the breadth of research design experience to be a researcher in any other field and, in some cases (particularly with positivist work), may not even realise that the field of research design is wider than they think.

Sources such as Crotty (1998) can give us some greater insight into this process of research design and the epistemologies, theoretical frameworks, methodologies and methods that exist within different types of research. However, even they can be simplistic, assuming that a researcher will follow a single line, have a single epistemology and way of thinking. In my case as a researcher, whilst this was the case initially, a change in focus led to a need to change my research approach, with a critical event occurring when I finally realised that this was the case.

Through resources such as Crotty (1998), I was able to change my epistemology, but then realised that I would still need to embrace my original epistemology in some cases. Rather than moving from one box to another, I expanded my viewpoint to include multiple different epistemologies. The research work on personal epistemology gave me some guidance in this area, but left me wondering how it all fit with Crotty's (1998) original ideas.

I finally came to the conclusion, through another critical event, that each of us can move within the spectrum of epistemology. Rather than selecting a side, we can choose a place to begin in the spectrum, but positioning ourselves to move around depending on the research questions we need to answer. It is through this that we can make the methodological manoeuvres required to become diverse, well-balanced researchers, developing a toolbox of different epistemologies for different situations. In the world of education technology research, this is important to allow us to bridge the gap between technology and education.

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