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TRANSFORMING RESEARCH METHODS EDUCATION: MODERN APPLICATIONS OF PEDAGOGICAL CONTENT KNOWLEDGE

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Abstract

This paper takes the concept of pedagogical content knowledge, which is well known in teacher education, and applies it in research methods education where it has not been previously used. It asks how experienced social science research methods teachers, who know their subject (method) well, teach advanced social research methods to others. Drawing on a wider, multi- method qualitative study conducted in the UK, the paper shows the participating teachers' orientation to teaching methods and how they combine knowledge of content and pedagogy in generic and distinctive pedagogy. It shows specifically their use of data for translating methods to become readily knowable for students. The case is made for identifying pedagogy through dialogic means as a vehicle for stimulating attention to the pedagogical dimension within policy- critical efforts to build research capacity.

Key Words: Research Methods, pedagogical knowledge, pedagogy, qualitative study, student

Introduction

The concept of pedagogical content knowledge that well known in teacher education, and applies it to social science research methods pedagogy in higher education where it has not been previously used. The research begins after studying the Evolving conceptualizations of pedagogy before discussing methods for researching pedagogy and evidence of its nature among teachers of research methods in the social sciences. The study discusses the contribution of the *Pedagogy of Methodological Learning* study to knowledge of how experienced methods teachers teach advanced social research methods to others.

pedagogy was originally defined by Shulman (Citation1987, p. 8) as 'a special amalgam of content and pedagogy' comprising knowledge of the representations useful for teaching a subject and knowledge of (mis)conceptions and difficulties with the subject commonly

experienced by learners. Shulman (Citation1986, p. 9) recognised that good teachers came to understand which were ‘the most powerful analogies, illustrations, examples, explanations, and demonstrations’ for making subject knowledge comprehensible. It is this knowledge that differentiates science teachers from scientists (Lee & Luft, Citation2008) or in my case, research methods teachers from researchers or methodologists. In essence, pedagogy is a matter of translating subject content for learners (Depaepe et al., Citation2013; Fernández-Balboa & Stiehl, Citation1995). While the concept has evolved, this core idea has been pivotal in discussions about building the capacity of researchers and of teachers of research methods within the National Centre for Research Methods in the UK.

The concept of pedagogy has become endemic in teacher education especially in science and mathematics where inadequate subject knowledge has been an issue. Shulman argued that translation of subject content was dependent on a level of subject knowledge that teacher preparation sometimes failed to engender. Social science research methods though, especially at the postgraduate/practitioner level, are often taught by methodologists who know their subject (method) well but who have not had teacher training. This creates different challenges for developing pedagogy and makes even more implicit than it is for trained teachers; it also means that this paper must address methods for knowing pedagogy in addition to the primary focus on the research findings.

Shulman’s initial question for the Knowledge Project was: ‘How does somebody that really knows something, teach it to somebody who doesn’t?’ (Cited by Berry et al., Citation2008, p. 1274). Relatedly, my question for this paper is: How do methodologists/methods teachers teach their advanced social research methods to people who don’t know fully how to use (or read) them?

Concepts in pedagogy

Since its inception, the concept of pedagogy has been honed (Berry et al., Citation2008) and the characteristics have been expanded as theorization has developed (Jing-Jing, Citation2014). Work on the concept has included understanding the categories of knowledge involved and their inter-relationship. As Kind (Citation2009) discusses, some evolving models have retained Shulman’s original concern with translating subject matter knowledge (SMK) but added components. Jing-Jing (Citation2014) similarly notes a series of clarifications of the components following adjustments in sub-components by Gudmundsdottir and Shulman (Citation1987): Tamir (Citation1988) added knowledge of evaluation and Grossman (Citation1990) brought in conception of teaching purposes, while Magnusson, Krajcik, and Borko (Citation1999) argued that the orientation to teaching (science) was important in shaping other knowledge components. There is not scope to list all the many conceptual developments here but Jing-Jing (Citation2014) provides a comprehensive overview. I do, however, note the distinction made by Hill et al. (Citation2008) between specific content knowledge and common content knowledge. This, plus teachers’ orientation to the subject matter, knowledge of content and teaching, and knowledge of content and students, were the key elements to emerge in the current study.

Moving beyond the components of pedagogy to the relationships between them, pedagogy sits alongside and interacts with ‘content knowledge, general pedagogical knowledge, curriculum knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, and knowledge of educational ends, purposes, and values, and their philosophical and historical grounds’ (Depaepe et al., Citation2013, p. 12). Gess-Newsome (Citation1999) distinguished between the integrative and the transformative model of the

relationships. The former conceives knowledges as separate to be mixed, as happens with newer teachers, and the latter as synthesised, as for experienced teachers (Lee & Luft, Citation2008). With a strong interest in the analysis of the practices of experienced teachers and what this could offer the research methods education community, I found the latter to be more applicable in this research.

In its evolution, pedagogy has also moved from being understood as relatively static to being seen as dynamic, both responding to context and developing through classroom experience (Lee & Luft, Citation2008; Major & Palmer, Citation2006; Oleson & Hora, Citation2014). For example, the advent of 'pedagogical content knowing' pedagogy introduced by Cochran, DeRuiter, and King (Citation1993), reflects a more constructivist stance in its dynamism. Dynamic versions stress 'knowledge in action' (Seymour & Lehrer, Citation2006), that is, pedagogy both reflecting and stimulating knowledge as Shulman recognised. Seymour and Lehrer (Citation2006) explain this in terms of teachers' orchestration of students' learning and their orchestration of their own pedagogy being 'co constituted' (p. 551); they are mutually reinforcing and transformative through moment-to-moment interaction in classrooms or interlaminated discourses.

Recent research has focused on empirically showing pedagogy and its effects (e.g. Iserbyt et al., Citation2017), as well as understanding better interventions to develop pedagogy (e.g. McNeill et al., Citation2016). The former has included confirming pedagogy as a predictor of student achievement in science education (Keller et al., Citation2017), although interestingly the researchers found that teacher motivation, expressed in enthusiastic teaching, was the better predictor of student interest.

The reach of pedagogy

Despite being influential in research on school teaching, pedagogy has had little permeation into higher education (HE) (Fraser, Citation2016) where often pedagogic knowledge (PK) has been secondary to content knowledge (pedagogy In the arena of research methods education and training there has been concern that the pedagogical culture is particularly under-developed (Wagner et al., Citation2011) in that there has been little research, debate or dialogue to inform pedagogic development. There are suggestions too that teachers in HE teach as they were taught (Oleson & Hora, Citation2014) and that learners of research methods are anxious and fearful (Ralston et al., Citation2016; Williams et al., Citation2016). There are, however, accounts of research methods educators refining their practice and exposing their decision-making to public scrutiny (see for example the special issues of *International Journal of Research and Method in Education* and *International Journal of Social Research Methodology* on this topic). These indicate critical reflection informing PEDOGOGY in terms of knowledge of content and students.

Other examples of pedagogical focus in research methods education include Navarro (Citation2005, p. 428) telling of her 'interrupting unreflected assumptions' in doing – and teaching – qualitative methods. This may indicate the reflexivity inherent in teaching that Hegarty (Citation2000) argues sets it apart from other knowledge-based activities. Examples of teaching mixed methods (Hesse-Biber, Citation2015; Ivankova & Plano Clark, Citation2018) and innovations in methods (Navarro, Citation2005; Purdam, Citation2016) show teachers working 'to some extent to generate in others learning that they have engaged – and may still be engaging – in themselves' (Hegarty, Citation2000, p. 452). Bringing PEDOGOGY out into the open makes it possible to expose and examine the 'general scripts for teaching' (Abell, Citation2008, p. 1405), including scripts about learners'

(mis)conceptions and difficulties and about the sources of these (Isiksal & Cakiroglu, Citation2008) which are rife in the discourses about statistics anxiety (Ralston et al., Citation2016).

Fernández-Balboa and Stiehl (Citation1995) have argued that pedagogy in HE is generic rather than subject specific: it comprises knowledge about subject matter, students, instructional strategies, context and teachers' own teaching purposes, but essentially, they maintain, tactics and beliefs cut across subject knowledge. Fraser (Citation2016) in contrast, found that Australian teachers' 'orientation to teaching science' (p. 144) – their beliefs about the goals of teaching science, the nature of science and about science teaching and learning – was pivotal. Fraser also found these professionals lamented the little reward in for scholarship regarding teaching, few opportunities for dialogue and sharing, and a content knowledge of support for innovating. In research methods education though, the pedagogical culture is undergoing change (Kilburn et al., Citation2014; Lewthwaite & Nind, Citation2016) and with the huge emphasis on building capacity through the research council investments (e.g. UK National Centre for Research Methods; Research Methods Training Centre) the time is ripe for looking at pedagogy. This includes pedagogy, in use and development, which is specific to research methods and even domain-specific to quantitative or qualitative methods.

Research Methods

Methods to study pedagogy have developed recognising that such knowledge is often implicit or tacit. In Polanyi's (Citation1958) formulation discussed by Hegarty (Citation2000, p. 453), pedagogy is 'subjective, context specific and not readily communicated other than by demonstration'. While pedagogy is about translating concept knowledge to become knowable to students, researching pedagogy also involves a process of translation to make it knowable. Without enabling teachers to externalise their pedagogy into explicit concepts it may be limited to being passed on in situ. Building on Hegarty's monologue on knowledge types, the capacity building agenda for research methods in the social sciences needs to recognise the craft involved (the tacit) and that teaching research methods is 'knowledge-based activity' (p. 456). It requires pedagogical knowledge, Concept knowledge and pedagogy and should not be reduced to something more instrumental. Teaching research methods involves beliefs and knowledge – about the subject and about the students – that warrant teasing out. This is particularly important if, as Hegarty (Citation2000) following Turner-Bisset (Citation1999) argues, 'students' learning experiences are governed by their teachers' beliefs about teaching' (p. 456). Methodologically, this requires probing the 'teaching moment' (p. 460) or rather, series of moments to get at the underpinning knowledge and beliefs.

The research literature on pedagogy is useful for indicating methods that have been deployed for identifying (and developing) pedagogy. Examples include talking to teachers and their mentors in that, from a community of practice stance, pedagogy may be held at the group rather than individual level (Abell, Citation2008). Just asking teachers may be insufficient though as pedagogy is difficult to surface and articulate (Berry et al., Citation2008; Fraser, Citation2016; Hill et al., Citation2008; Traianou, Citation2006; Zanting et al., Citation2003). Reflection and observation may be needed (Depaepe et al., Citation2013) and the nature of any asking may be critical. For example, Kinach (Citation2002) identified the PEDOGOGY of prospective mathematics teachers by asking them to explain something specific as if to someone learning it for the first time.

A range of methods for identifying pedagogy have been used. In their systematic review of

pedagogy in mathematics education, Depaepe et al. (Citation2013) found studies exposing pedagogy through methods of testing, questionnaire, interview, lesson observation, meeting observation, document analysis and concept mapping. Capturing pedagogy in action may make a case study approach suitable (Lee & Luft, Citation2008), enabling instructional decision-making to be explored in practice and in situ (Oleson & Hora, Citation2014). For Fernández-Balboa and Stiehl (Citation1995) the key to identifying pedagogy was in phenomenological interviewing to aid participants in ‘reflecting on and reconstructing their experiences of teaching’ (p. 296), teasing out their tactics and beliefs. Zanting et al. (Citation2003) add to the possible methods journal keeping, repertory grids, metaphors, drawing pictures or story-lines, and stimulated recall. For their study of the pedagogy of mentors to trainee teachers, stimulated recall was too time-consuming. They opted instead to combine interview (eliciting the practical) and concept mapping (eliciting the abstract). By their own recognition this meant that they did get beyond considered responses to understand pedagogy that was responsive in the moment.

Study and methods

Aims

This paper disentangles the pedagogy in use in research methods education (university modules) and in training (day courses on specific skills) in situations where pedagogical reflections were not necessarily supported by training or theory. Shulman refined his question from ‘How does somebody that really knows something, teach it to somebody who doesn’t?’ to become ‘how do the variety of ways teachers understand, interpret and make sense of their subject affect their teaching, planning, etc’ (2007 interview cited by Berry et al., Citation2008, p. 1274). Similarly, I aimed to explore the relationship between understanding a research method and teaching it, but I needed to stimulate dialogue between researchers and teachers to penetrate their understanding. This necessitated going beyond what teachers could easily rationalize to finding ways to elicit their thinking, beliefs and decision-making.

Methods

The data were generated over four years in a complex multi-method *Pedagogy of Methodological Learning* study interrogating the realities of social science research methods teaching and learning. One of the aims was to tease out pedagogy and there was scope to do this in different ways across the methods and participants shown in Table 1. The methods, chosen to address the multiple research questions of the wider study (Nind & Lewthwaite, Citation2018), provided space for teachers to elaborate on their pedagogic decision-making in general and, in the case of video stimulated dialogue especially, in more specific ways. Expert teachers for the initial panel part of the design were selected as experts by reference to their excellent pedagogy evidenced through landmark publications, combined with pedagogical knowledge evidenced by their significant teaching experience at a postgraduate level (see Lewthwaite & Nind, Citation2016). All the teachers in the study though were experienced methods teachers, whether working in universities or social research and training organizations, and the students were doctoral researchers or researchers updating their skills.

Table 1. Methods and participants.

Research had been conducted largely by Skype, with questions focused on pedagogic choices, rationale, influences and contexts. Emergent themes were discussed among some of the expert panel in an online forum and taken forward into the focus groups as core topics to explore their resonance for teachers in diverse contexts. The dialogic nature of this data generation and analysis was specifically intended to support teachers in articulating their pedagogy. This

was further enhanced in the video stimulated dialogue advocated by Zanting et al. (Citation2003). This involved observing and video recording a day or half day of research methods teaching and using video excerpts to prompt recall and reflection within a focus group discussion immediately following it. This provided an opportunity for thoughtfulness about what went on in the teaching moments selected by researchers or participants, helping to unpack tacit knowledge implicit knowledge that would not otherwise have been seen or told. (For a thorough discussion of this method see Nind et al., Citation2015.) Finally, in two in-depth case studies, interviews/video stimulated dialogue was supplemented by informal conversations, (around 35 hours of) observation recorded in field notes, and access to planning and evaluation meetings to capture pedagogic decision-making in action. The case studies allowed for the pedagogy to be explored from varied standpoints and returned to for repeated reflections.

The study, which was conducted in England, was given ethics approval by the University of Southampton and the emphasis was on an ethic of care and participation. The participants were not being judged for the effectiveness of their pedagogies, rather invited into an ongoing conversation and process of building the pedagogical culture for research methods education. While the formal analysis was the domain of the researchers, everyone who participated was invited to analyse their practice in dialogue with peers, researchers and the self (see Nind & Lewthwaite, Citation2018).

Analysis of the entire dataset of transcripts, field notes and teaching documents was conducted by two researchers. First stage coding was conducted independently, a second stage was collaborative to agree a codebook and core definitions, and a third stage was independent again. This iterative approach comprised a mix of freehand and NVivo coding and some hypothesis coding (Saldaña, Citation2016). A constant comparison, thematic approach was adopted.

Analysis was focused on generating insight into pedagogy as specified, enacted and experienced (Nind et al., Citation2016). Horizontal analysis identified themes that cut across the dataset or subsets of it (e.g. teachers of quantitative methods). Simultaneously, vertical analysis of single transcripts/teachers made sense of individual approaches to teaching a specific method in a specific context. As a summative stage we generated findings summaries for each of the leitmotifs, including two on pedagogy, responding to the questions: ‘what do we know? how do we know it? Where is the evidence? Where is the counter-evidence? And what are the headlines?’

Findings

I present the findings beginning with the participating teachers’ orientations to teaching – their beliefs about the goals of teaching their method(s) and where these come from. This is both because this is shown in the literature as pivotal in shaping other knowledge components (Fraser, Citation2016; Magnusson et al., Citation1999) and affecting decisions about which knowledge is important (Liepertz & Borowski, Citation2019), and because this was a strong part of the data. Next I present the participating teachers’ pedagogy in terms of knowledge of students’ understanding and misconceptions, knowledge about context, knowledge of instructional strategies and representations, and specific/distinctive pedagogy. My interest in these relate to the early conceptualisation of pedagogy and the conceptual refinement made by Magnusson et al. (Citation1999). The focus on specific and domain-specific pedagogy reflects that teaching through, with and about data constituted one of the findings summaries. Lastly I present the participants’ transformational knowing in action. I

refer to the expert teachers by name, as agreed with them.

Orientations to teaching

Participating teachers spoke passionately about what it was they were aiming to do when teaching research methods. This often dominated their responses to opening questions about their key methodological interests and areas of teaching. Analysis indicated the origins of their orientations to teaching this content, their: (i) own experiences of learning/being taught research methods; (ii) methodological experience; (iii) formal training; (iv) early experiences with teaching; and (v) pedagogical beliefs and values. Paul Vogt, for example, narrated early experiences of needing to modify the research methods training curriculum and approach. He described trying to find verbal ways of representing the statistical material, with students learning how to read real research outputs in their discipline and coming to content knowledge to the technical aspects later. Founded on these experiences he learned to translate the Content knowledge using a verbal approach to quantitative methods by giving verbal descriptions of technical terms, culminating in his dictionary of statistics and methodology (Vogt & Johnson, Citation2015). Andrew Gelman similarly spoke of teaching statistics as if it were a foreign language, reflecting a belief about the need to understand and speak the language of statistics.

Teachers of qualitative methods often referred to their goals: Yvonna Lincoln explained her concern that her students should ‘understand that when you switch paradigms or world views, you really switch the ethical grounding of what you do’. She recognized the roots of this pedagogical orientation referring to a kind of ‘inheritance’ from our ‘intellectual mothers and fathers’ in that ‘there is a very real sense of doing it in the same vein, if not the same way, in the same vein as you were taught to do it’. Similarly, Bagele Chilisa, teaching research methods in Botswana but trained in the USA argued, ‘my standpoint is that they [students] have to have a standpoint ... we are not teaching bible knowledge ... we are looking at standpoints and standpoints that we use to arrive at certain knowledge’. This stance underpinned and infused her pedagogy. Sharlene Hesse-Biber recalled ‘teaching feminist perspectives on research, with a historian and with an English professor. The three of us were in the classroom together; all hell broke loose! We knew nothing about how to teach, together.’ Those, she recalled, were ‘pivotal moments’ impacting on her pedagogy and teaching her ‘to be reflexive on my own positionality’.

Many of the experienced qualitative teachers, like the expert panel, conveyed what was really important to them to communicate to learners, where this came from in their own journeys, and how they to content knowledgeled it in their teaching. One (FG4) spoke of coming to understand from her own experience in learning research methods that criticality was fundamental, and in terms of learning how to translate this for students to understand that doing – and not just reading or hearing about – research was the key.

Regardless of the methods they taught or their career paths, the teachers’ pedagogy had mostly developed through practice without support from formal teacher training. This experience was sometimes painful and arduous. One (FG5) felt that in his university too much emphasis had been put on research methods and that pedagogy had ‘got lost in the shuffle’, especially when research methods was the ‘short straw’ – the thing that no one wanted to teach. Participants overwhelmingly appreciated the opportunity the research gave them to discuss how their counterparts in other settings were translating their knowledge and beliefs for student learning and they seized upon each other’s pedagogy and the idea that this would be shared.

Knowledge of students and context

Pedagogy was largely built up from a mix of good content knowledge and addressing challenges as they arose, posed often as challenges residing in the student or context. The quantitative methods teachers in particular spoke of strategies they had devised for responding to the perceived challenge of students being unprepared, misinformed, fearful or poorly motivated and across the board teachers referred to the challenge of learners being diverse and often somewhat unknown. One example of student misconceptions conveyed by one quantitative methods teacher related to the danger of students wanting to operate software pacontent knowledgeages with inadequate understanding:

so lots of the questions that we get asked is just about, “what is the next button to clicontent knowledge?” And students aren’t thinking about why they’re clicontent knowledgeing that button and what that means, they just want to know “am I clicontent knowledgeing the right button? What’s the next button to clicontent knowledge” (FG2)

This kind of student error was strongly countered, with another quantitative methods teacher (VSD6) commenting, ‘I firmly believe that if you don’t teach the underlying theory you’re not producing independent learners. You’re just – okay go away and press buttons.’ Part of her instructional repertoire was teaching people ‘how *not* to do things’. Referring to qualitative analysis Johnny Saldana observed, ‘this new [hand] book reflects my teaching beliefs ... that analysis is the most difficult thing from my experience, for students to grasp’. John Creswell explained how he tested materials in class and brought student examples into his books, going between the classroom and textbook as part of clarifying his pedagogy.

All participating teachers spoke at length about the contextual constraints of time, resources and group size and many spoke of the context of the rapidly changing data landscape. While compressed contact time was challenging, teachers (both in universities and social research organisations) particularly lamented the lacontent knowledge of time for meaningful pedagogical dialogue with colleagues that could have helped them with ideas. Without dialogue or training it was the subject knowledge and practice that really guided their pedagogy in terms of instructional strategies. Teachers had honed their ability to draw on their own research experiences in communicating lessons to students, not wanting them to make the same mistakes they had made.

Knowledge of instructional strategies

Generic pedagogy

One of the debates in the literature is whether pedagogy in HE is generic – as Fernández-Balboa and Stiehl (Citation1995) argue – or domain or topic-specific. This begs the question of whether research methods teachers’ tactics and beliefs cut across subject knowledge or are distinctive to it.

Undoubtedly generic pedagogy was evident in the dataset culminating in one findings summary in the analytic process. Examples included classroom organisation knowledge pertaining to when whole class, group or pair work might be helpful, knowledge about how to pace the learning, and knowledge about how to structure the learning with scaffolding, chunking and reverse engineering all discussed. Johnny Saldana spoke of his strategy of ‘spiralling bacontent knowledge, looping, making references to previous work’ and his rationale, ‘because I’m a big believer in synthesising and integrating learning experiences’, and also of covering ‘craft pieces of knowledge’ before going on to ‘the art of it, the design of a research study’. As a trained teacher, Saldana was unusual in being able to articulate what he called his ‘signature beliefs’, which travelled with him from drama education to research

methods education and from school to university teaching.

Many of the teachers reflected on their choice of starting points when teaching a research method, for example:

You know they come in thinking “I’m going to learn the how to do interviewing and how to do focus groups or observations”, but the first lecture is nothing about any of the technique of it, it’s about the politics of research you know, and it does blow their mind and some of them really warm to it (FG4)

Amanda Coffey, from her experience of teaching qualitative methods, argued it was important to provide ‘hooks, through which they can start to critically engage ... to give them ways in which they can become critical’. For Sharlene Hesse-Biber, the initial ‘object of reflection’ was the students themselves.

Specific pedagogy – teaching with, through and about data

Much of what was said about instructional strategies was more specific to the need to teach the specific research method through use of data. Methods are often taught outside or across students’ disciplines and use of data was widely regarded as the pedagogic hook through which these learners could be drawn in and their interest ignited: ‘you’ve got to provide enough hooks for someone to say this is relevant to me’ (FG4). Amanda Coffey was typical in putting data first: ‘I’m a great believer that you share data, examples of data, illustrations of data very early on ... I think it actually comes right at the start’. Similarly, qualitative expert Cesar Cisneros- Puebla spoke of the importance of students seeing the beauty of new data. Chris Wild’s whole approach to teaching statistical research methods was anchored on the belief that the teacher’s role was to enable students to be able to see things in the data which content knowledge. This led him to develop software to support the visualization of data and instructional strategies based on use of visual metaphor.

The pedagogy pertaining to strategies for teaching with data focused on what kind of data was most effective. The affordances of the learners’ own data were greatly appreciated. Mixed methods expert Pat Bazeley, for example, argued that without bringing their own data into the classroom or lab, it was hard for students to later make the leap to their own data which may be less clean or manageable. Referring to teaching qualitative methods, Johnny Saldana explained the need for ‘authentic data to be collected by the students in order to gain a sense of ownership’. The practical realities of doing this had also generated pedagogy among the qualitative teachers (FG1) about how to manage the amount of data that learners brought to work on. Strategies included seeing that data ahead of the workshop and working in small groups on the most suitable data. Quantitative methods teachers, whether expert or experienced, were more wary of working with student data because the messiness of that data often required more staff time than was available. The utopia of working with student data for them was often replaced by engaging with interesting public datasets.

All teachers knew the value of their own research data as part of telling their stories of experiences of using research methods, because, as one survey methods teacher explained ‘it’s all about the way you tell it’ (VSD5). Where they could, the teachers enabled more experienced students also to take on this role of sharing examples from experience. The teachers had learned how to mediate the additional resource of fresh authentic accounts to illustrate dangers as well as good decision-making in real life contexts. The students in the video stimulated dialogues reinforced that this narrative practice worked for them, making the

learning more memorable and with the credibility prompting them to action. Teachers using their own data often did so with the intention of avoiding student misconceptions, as they could choose data of meaningful quality plus ‘the kinds of challenges and messages’ in the data (FG1), allowing transfer of students’ learning to their own data later. John MacInnes described how his statistics teacher colleague would ‘always use his real data, he’s always got the relevant data and he will always have pcontent knowledgeable out, you know different catchy things from it, before he’s going in to teach with it.’ A clear finding was that, apart from the occasions when fostering a willingness to be playful with data overrode other concerns (VSD2), use of relevant, authentic data was best for countering student anxiety and provoking interest.

The pedagogy extended to what to do with the data to support learning. Two messages were dominant: the value of immersion in authentic data (experiential learning) and the value of actively doing things with data (active or problem-based learning). One teacher of narrative methods was adamant:

it’s really important that they [students] get their hands dirty, and either with some of their own data, further along the line, or even you know some of your own ... let them have a play, and I think that’s very, very important (FG3).

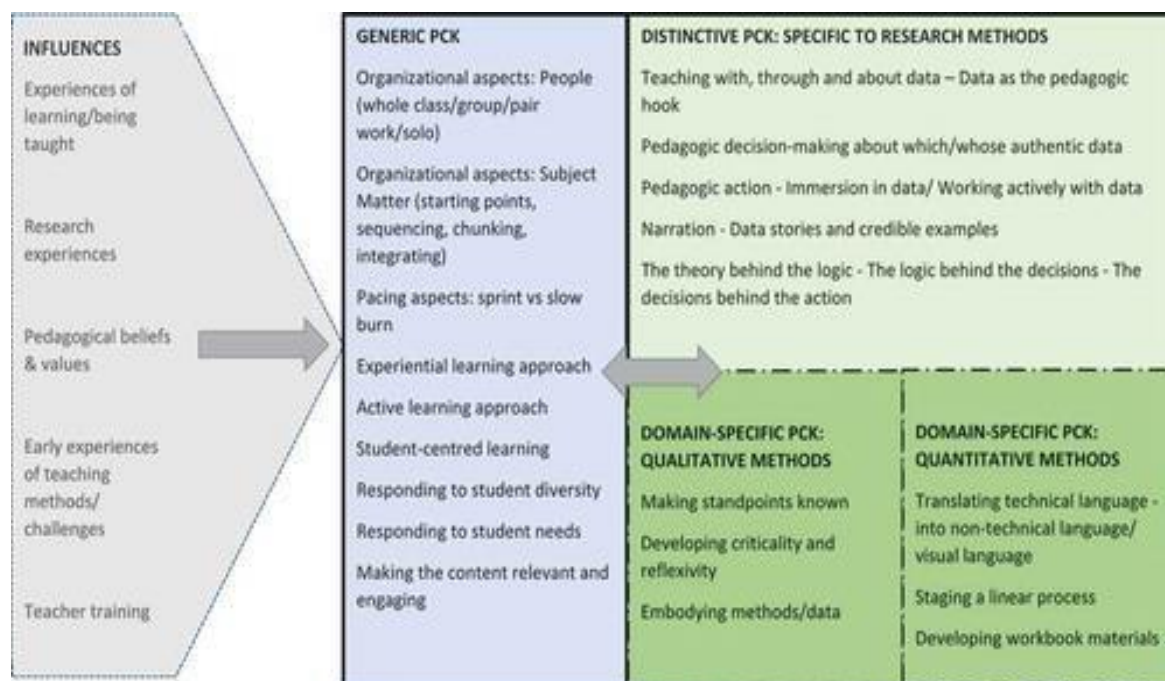
This led to a discussion of students needing to learn to make decisions in their analytic processes.

The quantitative methods case study (CS2) particularly illuminated the effort that teachers put in to creating data analysis exercises for each topic that the students could work through that would give them an appropriate mix of challenge and success. Quantitative methods teachers, whether expert or experienced, were particularly keen on students working practically on datasets, initially exploring and building competence gradually. They were balancing this hands-on work with their own walk-troughs; demonstrating and explaining were carefully interwoven with opportunities for problem-based ‘flying time’ (Malcolm Williams), thereby combining technical skill development with understanding of the necessary logic for sound judgments. Teachers’ linear sequencing of activity and content was about building difficulty and seen as particularly important when conveying knowledge with critical threshold concepts. Their work in being student-centred through their verbal, visual, and non-technical strategies was geared toward addressing what they saw as students’ anxiety and lacontent knowledge of preparation.

All the teachers of qualitative methods also held such specific rather than common pedagogy. Here experiential more than active learning was valued in order that students engaged deeply with, and even embodied, data (by reading it aloud for example as Johnny Saldana explained). Many of the in-class tactics (Nind & Lewthwaite, Citation2019) were about facilitating the understanding of standpoints and developing reflexivity which required more group work and more discussion than quantitative methods teachers used. The products of activities such as writing their own life histories or ethnographic self-portraits were often shared and reflected upon together (CS1). Video stimulated dialogue indicated pedagogy about trusting students to work with the data and come to their understanding and skills rather than over-orchestrating the learning (VSD7). Stimulating the qualitative imagination required different skills to stimulating the statistical imagination, still making use of questioning and data, but often in more sensory ways and within a holistic rather than linear structure (CS1).

Figure 1 summarizes the mix of generic and specific pedagogy; it draws on the concept of pedagogy as integrating different knowledge and influenced by the teachers' orientation to the subject.

Figure 1. pedagogy in research methods education.



Display full size

Video stimulated dialogue data showed pedagogy in development in that here especially teachers were enabled to see the contextual nuances of their pedagogical decision-making. One teacher, for example, reflected aloud for learners her thinking that, 'then [specifically] I wanted you to see both sides and make your own decisions, but other places there are, there are clear suggestions' (VSD5). She had been helping the students learn how to think through survey design issues via her mix of modelling and questioning which she judged in the moment. The example, recalled via video and reflected upon, enabled the knowledge in action to come alive. The teacher explained,

This is the dynamic Pedagogy that Cochran et al. (Citation1993) propose.

Mostly the pedagogical decision-making reflected a mix of what had been tried and found to work and adapting to new situations such as deriving from the unpredictability of student responses. The research methods themselves could be refined in these dynamic and dialogic spaces.

Discussion

It explores how experienced methods teachers teach advanced social research methods to others. The discourse of poor pedagogical culture in research methods education (Wagner et al., Citation2011), reinforced by my thinking about pedagogy as hard to know, led me to anticipate that this would be challenging to do. However, by using a set of dialogic research methods the study was able to support the participants to make their pedagogy knowable to themselves and others. Together we were able to elicit a picture of a blend of generic and distinctive pedagogy. This is an important contribution in that 'pedagogy is not context-free' (Mu et al., Citation2018, p. 25) and the research methods education context is new for pedagogy research.

The study has shown that, while methods teachers may not be able to cite educational theorists informing their work and may not read about the pedagogic efforts of others, they do have working theories about how their social science research methods should be taught. Their know-how (Ryle, Citation1949) is contextual and specific, more readily shown than explained, and in the process of ongoing development: thus in articulating their pedagogy they were doing what Hill et al. (Citation2008) describe as attempting to ‘build the ship while sailing in it’ (p. 396). The reluctant methods teachers that Daniel (Citation2018) describes, who teach at a more introductory level and who are likely to have less pedagogy than the committed methodologist- teachers who participated in this study, can benefit from it. Sharing the working theories of experienced teachers about how social science research methods should be taught is, I argue, an act of knowledge translation with practical benefits.

My working premise has been that building capacity in research methods is less about knowing what works (the policy focus) and more about knowing why teachers work in the ways they do to communicate research methods to others (the pedagogic focus). This premise underpinned the decision to incorporate into the research design conversations in dyads and groups, sometimes aided by video and by students and their insights. This resonates with the ‘dialectical ‘conversation’’ that Kinach (Citation2002, p. 54) argues is involved in transforming know ledges like pedagogy into pedagogy. It also echoes the advocacy of professional learning communities for developing pedagogy (van Driel & Berry, Citation2012; Mu et al., Citation2018).

Dialogue is one of the ways in which teachers move beyond the safe option to ‘operate in the way they were taught’ (Fraser, Citation2016, p. 153) to reflect and reflect again from the standpoint of others. Fraser (Citation2016) found (in the context of science education) that the strength of pedagogy was key to willingness to take pedagogic risks and this might be one reason why, in the context of this study, the expert panel could articulate the risky changes they had made to their practices. It is, however, likely to have been their ability to anticipate student difficulties that made their risks wise ones to take. Identification of pedagogy is not done so that others can emulate expert teaching, but so that teachers’ professional knowledge is stimulated as they proceed, context-bound, through cycles of (hopefully collaborative and dialogic) practice and reflection (van Driel & Berry, 2012). It is particularly useful, therefore, to conceptualize pedagogy as knowledge of content and students intertwined (Hill et al., Citation2008) and to see development of pedagogy as a personal and cultural active process and through ‘constructivist and simulative’ lenses (van Driel & Berry, 2012, p. 27).

Conclusion

In answering the question of how does someone teach a social science research method to a group who don’t know it, I have shown that the starting point is often data that the students can relate to. I have shown that methods teachers make decisions about which data work best for pedagogic purposes and about how to enable students to engage most productively with those data. Moreover, teachers’ instructional strategies are differentiated according to the (quantitative or qualitative) nature of the research methods they teach and their specific situations. I have shown pedagogy at work within a pedagogic context in which the concept has not been applied previously and presented evidence of a general and fine-grained level of pedagogy adapted for quantitative and qualitative methods. Participating methods teachers, I argue, continually integrate to dynamically develop pedagogy in the interests of generating technical competence and deep understanding. The process of Pedagogy in the research methods education arena of the study was supported by dialogue with others. By making some of the teachers’ implicit knowing more explicitly and conceptually known to them I

sought to support them – in Shulman’s terms – to be the best teachers they could be. Pedagogy among teachers and trainers without formal teacher education may be hidden from view, but I concur with Fraser (Citation2016) that, once excavated by stimulating meta cognitive processes, awareness of pedagogy is supportive of its further development in a virtuous circle. Mostly the teachers in this study had learned their tacit knowledge through what Hegarty (Citation2000) identified as socialization or apprenticeship. Through externalizing pedagogy in its articulation into explicit concepts the process of switching knowledge to new contexts and generating new knowledge is facilitated. This is worthwhile in that advancing pedagogy is a way of advancing instructional quality (Depaepe et al., Citation2013).

It is a limitation of this study that it did not include a longitudinal or action research type element of following up with methods teachers over time. This might have produced evidence of the articulation of pedagogy having effects on practice. Nonetheless, the study has indicated that there are strong pedagogy foundations on which further collaboration, training and development can be built. To achieve a committed learning community of methods teachers, pedagogical conversations – even those with new language and concepts – need to resonate with people’s experiences (Fraser, Citation2016). Helping methods teachers to see their own pedagogy is a promising way of doing this and of bringing greater reward for strategic investment in the training of future social science researchers.

References

1. Abell, S. K. (2008). Twenty years later: Does pedagogical content knowledge remain a useful idea? *International Journal of Science Education*, 30, 1405–1416.
2. Berry, A., Loughran, J., & van Driel, J. H. (2008). Revisiting the roots of pedagogical content knowledge. *International Journal of Science Education*, 30, 1271–1279.
3. Cochran, K. F., DeRuiter, J. A., & King, R. A. (1993). Pedagogical content knowing: An integrative model for teacher preparation. *Journal of Teacher Education*, 44, 263–272.
4. Daniel, B. K. (2018). Contestable professional academic identity of those who teach research methodology. *International Journal of Research and Method in Education*, 41, 548–561.
5. Depaepe, F., Verschaffel, L., & Kelchtermans, G. (2013). Pedagogical content knowledge: A systematic review of the way in which the concept has pervaded mathematics educational research. *Teaching and Teacher Education*, 34, 12–25.
6. Fernández-Balboa, J.-M., & Stiehl, J. (1995). The generic nature of pedagogical content knowledge among college professors. *Teaching and Teacher Education*, 11, 293–306.
7. Gess-Newsome, J. (1999). Pedagogical content knowledge: An introduction and orientation. In J. Gess-Newsome & N. G. Lederman (Eds.), *Examining pedagogical content knowledge: PEDOGOGY and science education* (pp. 3–17). Dordrecht, The Netherlands: Kluwer. [Google Scholar]
8. Grossman, P. L. (1990). *The making of a teacher: Teacher knowledge and teacher education*. New York: Teachers College Press. [Google Scholar]
9. Gudmundsdottir, S., & Shulman, L. (1987). Pedagogical content knowledge in social studies. *Scandinavian Journal of Educational Research*, 31, 59–70. [Taylor & Francis Online], [Google Scholar]
10. Hegarty, S. (2000). Teaching as a knowledge-based activity. *Oxford Review of Education*, 26, 451–465. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
11. Hesse-Biber, S. (2015). The problems and prospects in the teaching of mixed methods research. *International Journal of Social Research Methodology*, 18, 463–477. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]

12. Hill, D., Loewenberg Ball, D., & Schilling, S. G. (2008). Unpack content knowledge: Conceptualizing and measuring teachers' topic-specific knowledge of students. *Journal for Research in Mathematics Education*, 39, 372–400. [Crossref] [Web of Science ®], [Google Scholar]
13. Iserbyt, P., Ward, P., & Li, W. (2017). Effects of improved content knowledge on pedagogical content knowledge and student performance in physical education. *Physical Education and Sport Pedagogy*, 22, 71–88. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
14. Isiksal, M., & Cakiroglu, E. (2008). Preservice teachers' knowledge of students' cognitive processes about the division of fractions. *Hacettepe University Journal of Education*, 35, 175–185. [Google Scholar]
15. Ivankova, N. V., & Plano Clark, V. L. (2018). Teaching mixed methods research: Using a socio-ecological framework as a pedagogical approach for addressing the complexity of the field. *International Journal of Social Research Methodology*, 21, 409–424. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
16. Jing-Jing, H. (2014). A critical review of pedagogical content knowledge' components: Nature, principle and trend. *International Journal of Education and Research*, 2, 411–424. [Google Scholar]
17. Kilburn, D., Nind, M., & Wiles, R. (2014). Learning as researchers and teachers: The development of a pedagogical culture for social science research methods? *British Journal of Educational Studies*, 62, 191–207. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
18. Kinach, B. M. (2002). A cognitive strategy for developing pedagogical content knowledge in the secondary mathematics methods course: Toward a model of effective practice. *Teaching and Teacher Education*, 18, 51–71. [Crossref] [Web of Science ®], [Google Scholar]
19. Kind, V. (2009). Pedagogical content knowledge in science education: Perspectives and potential for progress. *Studies in Science Education*, 45, 169–204. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
20. Lee, E., & Luft, J. A. (2008). Experienced secondary science teachers' representation of pedagogical content knowledge. *International Journal of Science Education*, 30, 1343–1363. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
21. Lewthwaite, S., & Nind, M. (2016). Teaching research methods in the social sciences: Expert perspectives on pedagogy and practice. *British Journal of Educational Studies*, 64, 413–430. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
22. Liepertz, S., & Borowski, A. (2019). Testing the consensus model: Relationships among physics teachers' professional knowledge, interconnectedness of content structure and student achievement. *International Journal of Science Education*, 41, 890–910. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
23. Major, C. H., & Palmer, B. (2006). Reshaping teaching and learning: The transformation of faculty pedagogical content knowledge. *Higher Education*, 51, 619–647. [Crossref] [Web of Science ®], [Google Scholar]
24. McNeill, K. L., Gonzalez-Howard, M., Katsh-Singer, R., & Loper, S. (2016). Pedagogical content knowledge of argumentation: Using classroom contexts to assess high-quality PEDAGOGY rather than pseudoargumentation. *Journal of Research in Science Teaching*, 53, 261–290. [Crossref] [Web of Science ®], [Google Scholar]
25. Mu, G. M., Liang, W., Lu, L., & Huang, D. (2018). Building pedagogical content knowledge within professional learning communities: An approach to counteracting regional education inequality. *Teaching and Teacher Education*, 73, 24–34. [Crossref] [Web of Science ®], [Google Scholar]

26. Navarro, V. (2005). Constructing a teacher of qualitative methods: A reflection. *International Journal of Social Research Methodology*, 8, 419–435. [Taylor & Francis Online], [Google Scholar]
27. Nind, M., Curtin, A., & Hall, K. (2016). *Research methods for pedagogy*. London: Bloomsbury Academic. [Crossref], [Google Scholar]
28. Nind, M., & Lewthwaite, S. (2018). Methods that teach: Developing pedagogic research methods, developing pedagogy. *International Journal of Research and Method in Education*, 41, 398–410. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
29. Oleson, A., & Hora, M. T. (2014). Teaching the way they were taught? Revisiting the sources of teaching knowledge and the role of prior experience in shaping faculty practices. *Higher Education*, 68, 29–45. [Crossref] [Web of Science ®], [Google Scholar]
30. Polanyi, M. (1958). *Personal knowledge*. Chicago: University of Chicago Press. [Crossref], [Google Scholar]
31. Purdam, K. (2016). Task-based learning approaches for supporting the development of social science researchers' critical data skills. *International Journal of Social Research Methodology*, 19, 257–267. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
32. Ralston, K., MacInnes, J., Crow, G., & Gayle, V. (2016). *We need to talk about statistical anxiety* (NCRM Working Paper 4/16).
33. Ryle, G. (1949). *The concept of mind*. London: Hutchinson. [Crossref], [Google Scholar]
34. Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: Sage. [Google Scholar]
35. Seymour, J. R., & Lehrer, R. (2006). Tracing the evolution of pedagogical content knowledge as the development of interanimated discourses. *Journal of the Learning Sciences*, 15, 549–582. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
36. Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57, 1–22. [Crossref] [Web of Science ®], [Google Scholar]
37. Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14. [Crossref], [Google Scholar]
38. Tamir, P. (1988). Subject matter and related pedagogical knowledge in teacher education. *Teaching and Teacher Education*, 4(2), 99–110. [Crossref] [Web of Science®], [Google Scholar]
39. Turner-Bisset, R. (1999). Knowledge bases for teaching. *British Educational Research Journal*, 25, 39–55. [Taylor & Francis Online], [Google Scholar]
40. Van Driel, J. H., & Berry, A. (2012). Teacher professional development focusing on pedagogical content knowledge. *Educational Researcher*, 41, 26–28. doi:10.3102/0013189X11431010 [Crossref] [Web of Science ®], [Google Scholar]
41. Wagner, C., Garner, M., & Kawulich, B. (2011). The state of the art of teaching research methods in the social sciences: Towards a pedagogical culture. *Studies in Higher Education*, 36, 75–88. [Taylor & Francis Online] [Web of Science ®], [Google Scholar]
42. Williams, M., Sloan, L., Cheung, S. Y., Sutton, C., Stevens, S., & Runham, L. (2016). Can't count or won't count? Embedding quantitative methods in substantive sociology curricula: A quasi-experiment. *Sociology*, 50, 435–452. [Crossref] [PubMed], [Google Scholar]