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Then and Now: Past Experience Echoed in University Computing Teachers' Current Practice

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Abstract: *Individual experiences, and the sense we make of them, shape who we are. For educators, experiential narratives affect both their day-to-day practice – the way they teach – and also the kind and quality of changes they make to their practice. In this work, we draw on data collected as part of a longitudinal study for the Sharing Practice project to explore how teachers' experiences are "echoed" in their current practice. We describe the concept of 'pedagogic stance' and propose ways in which it may be identified. We suggest that an understanding of pedagogic stance may enable researchers to affect educators' practice more effectively.*

Introduction

Successful interventions to affect teaching practice require an authentic understanding of practitioner knowledge. As McCrea and Bulanda observe:

“Improving practice depends on accurate understandings of practitioner knowledge, which are not easily attained, partly because practitioners unevenly apply formal theory and also rely on reflective processes and power bases that are significantly different from those of researchers.” (McCrea & Bulanda, 2010)

There have been a number of attempts to describe practitioners' epistemology of practice. Shulman, for instance, considers different categories – content knowledge and general pedagogical knowledge, among others – in his model of teacher knowledge (Shulman, 1987). He is particularly concerned with pedagogical content knowledge, which, for him, is an essential part of the educator's practice and “represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (Shulman, 1987). However, he steps short of characterizing how teachers' conceptions in these categories are influenced.

In fact, research on teachers' personal knowledge has seldom considered the role of prior experiences explicitly. A meta-review by Clandinin and Connelly found that while most authors implicitly assumed prior experiences to explain teachers' behaviour in the classroom, few actually considered it in their research design (Clandinin & Connelly, 1987). More recent efforts, for example by van Manen to frame noncognitive knowing (van Manen, 1999) and Anderson and Page to describe personal knowledge (Anderson & Page, 1995), include the role of past experiences in their models, but as one equally-weighted element amongst many.

In this work, we explore just how teachers' past experiences affect their knowledge and how they are “echoed” in their current practice.

Context of the Data: The *Sharing Practice* Project

The Sharing Practice project (<http://www.sharingpractice.ac.uk>) conducted a series of investigations, focused on questions of how, when and with what evidence teachers (in Higher Education) change their practice. The project collected data in a number of ways, including through diary studies and by eliciting stories of change in teaching practice (Fincher, Richards, Finlay, Sharp, & Falconer, 2012). This work, however, draws on another investigation: a longitudinal study with eighteen educators who worked (broadly) within Computing at institutions ranging from research to teaching intensive. Over the course of three years, these educators were engaged with a number of separate interventions (see (Fincher, 2012) for details). The “baseline” interview with each participant included an exploration of his or her personal teaching history. Participants were also asked to identify one of their course modules and, in a later intervention, to describe changes they made to it. In the final interview, three years later, participants were asked to narratively reflect on their teaching career to date. The final interview was scaffolded by a prompt derived from Dan McAdams’ work on life stories (McAdams, 1997):

I'd like you to think about your teaching career, your teaching “life”, as if it were a book. Each part of your teaching composes a chapter in the book. Certainly the book is unfinished at this point: still, it probably contains a few interesting and well-defined chapters. Please divide your teaching “life” into its major chapters and briefly describe each chapter. You may have as many or as few as you like, but I'd suggest at least 2 or 3 and at most 7 or 8. Think of this as a general table of contents for your book. Please give each chapter a name and describe its overall contents.

When the participant had completed that, the researcher asked: *Looking back over your teaching career, with chapters, episodes and characters, can you discern a central theme, or message or idea that runs through the text?*

As well as working on this data as separate sets, it became apparent that ideas or experiences expressed in one intervention were sometimes reflected in others which had been designed for other reasons. For this paper, the primary material we draw on is the “baseline” interview undertaken with each participant, and the final interview.

Although these are the two main sources of material, the Sharing Practice project had extended interactions with these participants. This analysis is not the result of directed research: we do not aim to report the results of the longitudinal study in this paper and instead describe a set of observations emergent from the data. This work is opportunistic and interpretive, dependent on the apprehension of themes, and especially on the identification of what we have called “echoes”.

Echoes

An echo is where we apprehend something in a teacher’s practice that reminds us of something they have talked about happening in their earlier experience. For us, echoes have certain features.

- Echoes are more or less distorted reflections; sometimes they are clean and clear, sometimes faint and partial. Especially in the latter case, others may disagree with the interpretation, or may not agree that they represent the phenomenon that we claim they do, that they are echoes of something else, or have quite a different origin from that we assert. (Sometimes these dissenting voices are those of the very participants in the study.)
- You cannot know that something is an echo unless you also have experience of the original, so there may be many missed echoes, not because they are not evident in the text, nor because we did not “hear” them, but because we have no referent for them. They simply appear as, and are interpreted as, aspects of practice. (This is not limited to this data, of course).

- All the narratives we draw on, and present, are individual. They are one teacher's story, told by them, from their history and perspective. However, when viewed together, these are rarely idiosyncratic. The structurally similar features of education, of teaching and learning, mean that there are similarities between stories, "families" of experiences. Increasing methodological sensitivity to these recurrent forms mean that sometimes we heard echoes where it is the referent that is faint.

A Word on Methodology

There have been recent calls for a reconsideration of the interview as an unproblematic method of gathering and presenting data in higher education research (e.g. Clegg & Stevenson, 2013). This work is placed firmly in the territory of this debate. The original identification of echoes emerged "in the room", in the course of discussion, recognized by the researcher as they talked with the participant. But the echo was, most often, from a separate intervention and a more distant discussion. In this the recognition was much more like knowing something about someone's history (a colleague, or friend) than it was a product of deliberate enquiry, coded and grouped into themes well after the fact. It appeared as knowledge not deliberately sought, but simply gained by long acquaintance and acknowledged as part of an individual's story.

In trying to capture and present these moments of recognition, their ephemeral appearance and the depth of their dependency on the context of the work both became apparent. Although often encountered as such, an interview is not a text. The text is, at best, a secondary notation. Going to a transcript to find evidence of an echo was a frequently frustrating experience. The phrases did not seem as clear or rich, or, when presented to others, as compelling. Indeed, if an interview was a text, we would have written the examples much better. The strength of the recognition of an echo seems to lie in the interview as an experiential and reflexive act, and in the intersubjectivity of researcher and interviewee. The identification of an echo was not initially (and seldom at all) in the conscious practice of the researcher. Rather it was signalled by what we came to call "researcher goosebumps"; that is, the recognition in-the-room and in-the-moment that something important had been said, that should be sought for again, after the interview.

The next section presents a collection of echoes, structured around two distinct thematic groups. These groups emerged from the commonality of the referents and metaphors our participants used, not from any particular institutional affiliation, either as student or teacher.

Hearing Echoes

The Importance of Authority

There is a group of teachers who have started their teaching careers by formally teaching a course (normally, but not universally, at University). They are characterised by a command of disciplinary knowledge; an ability to do something, and, usually, do it very well:

[Origin] "I can remember the first time I got 100% for an assignment and it was an assignment I had really worked hard to do well on, so I'd gone way beyond the spec and everything like that because I loved what I was doing and I wanted to be good and then when you got the 100% you think, 'Yes. It was worth it'. It was fantastic."
[PH]

[Origin] "... there were like X number of questions worth a mark and a half each it was. You'd figure, 'I'm just going to get all those marks.' And I remember saying to another student, 'Well, I'm always going to get 15 out of 15 there, whatever it might be.'" [BH]

Alongside their abilities, they have an associated disdain for those, especially teachers, who do not share their competence:

[Origin] “I was obviously quite a bright kid at junior school and I think I also developed a bit of an arrogance and a contempt for my teachers. Some of them anyway. I could tell the teachers that didn’t really know very much ... I wasn’t afraid to point out that they had got something wrong, you know, converting miles to kilometres in a maths class. I can definitely remember doing that.” [PH]

[Origin] “I learned programming myself, with a small group of people of same age in high school ... We did not have a teacher who understood computers and so after a week everyone who was interested knew more than the teacher. ... And then sort of a year later we started having actually Computing as a subject, and we took it, but by then a whole group of students knew more than the teacher did.” [MW]

[Origin] “I also had teachers who were pretty hopeless and where you realised that if you didn’t go off and read the book you were never going to get anything from their lectures. You pretty much had to self-teach in their courses ... [Researcher] You were the student who went and did it? Absolutely, yes. Because I wanted to pass those courses. I didn’t want to be hamstrung by people who were useless.” [PH]

Their subject expertise becomes expressed in their early teaching experiences:

[Origin] “... the first bit of teaching I did I realised that I could look at people’s programmes and realise what was wrong and point it out and then they would learn to go do stuff “ [PH]

[Origin] “I did courses at a sort of... adult evening continuing education thing ... they had a policy that anyone could propose a course, and as long as enough people signed up they would put it on. I enjoyed the subject. I had been programming for a while and I needed money and I thought I can teach that to someone” [MW]

Their disciplinary engagement, their history and experience and belief that disciplinary accuracy and authority, deep knowledge, is of primary importance in teaching carries through to their subsequent (current) practice.

[Echo] “But I think accuracy for me is really, really important ... I think from a student’s point of view it’s not fair if they see an example in a textbook and they go and type it in or do something and it doesn’t work, well they probably don’t have the expertise to work out why it doesn’t work, and so that’s unfair on the students to do that. That is quite important for me.” [PH]

The echoes that we hear here are of knowing things and teaching things *because* we know them. Lack of content knowledge (rather than lack of aptitude, skill, approach or enthusiasm) is a prohibition: disciplinary authority is key.

The Importance of Sequence and Example

For another group, their formative teaching experiences was not within the University, but in other endeavours. Here they are translating from one domain to another; taking features of success and instantiating them in the classroom. Here is the description of early experience from an academic whose first teaching context was as a scuba diving instructor:

[Origin] “But that was the whole point you see. When you first walked into the swimming pool, all you had to do was put your head under the water with the gear on and then you could stand up if you were unhappy, so there was a real scaffolding. That was what was so impressive, is the scaffolding was there.” [SB]

This academic is quite clear about the debt his disciplinary teaching owes to this early exposure. The echoes in his current practice, teaching introductory programming, are loud and audible to him:

[Echo] “... we didn’t like the examination at Christmas ... oh! ... this had come from the diving actually. It’s quite clear in diving that there were people who got it in the

second or third week, for example they'd learnt how to clear their mask, which is a fundamental skill: you've got to have that before you can carry on because you've got to know that they can cope when the chips are down. And people got there at different rates. So if you'd had an examination at week three you'd have chucked a whole load of people out who probably would've got the clearing mask thing at week seven, but they hadn't got it at week three. And some of the best people in the club were people who had in fact not found it very easy to start with but they turned out to be real stars in all sorts of ways." [SB]

Other academics are explicit that the sorts of teaching they do in one domain are *not* transferrable to another. This educator started teaching as a martial arts instructor:

[Origin] "...The organisation of a sports class, especially martial arts, is completely different ... you warm everyone up together and then you have to separate them up ... you have to do that, and then you kind of start rotating; you have to remember where everyone is and then teach them bits, and then you start rotating around ... always by example, always by example." [Researcher] *How could you tell if they were learning?* "You would keep an eye on them over a period of weeks. You teach them the moves and then you'd let them get on with it, and then you come back to them 20 minutes later and say, "Show me." And if they couldn't do it you showed them again, you know, it was literally just drilling, you know," [LD]

And even though the educator himself denies it, we hear echoes of this in his subsequent descriptions of organising a computing class. He says of his martial arts instruction that it is "always by example, always by example. In the sports context you say 'Look this is how you do it' and then you would do it, and then you would get them to mimic you, and so it's a very different way of teaching". When he is talking of his disciplinary teaching, he says:

[Echo] "It's the way I designed the course. ((laughs)) ... because it was a practical course they needed contact time, they needed practical time." [LD]

[Echo] "... I did ask them early on *not* to do the assessment. If I saw them doing the assessment in the practical classes I told them off. I said, 'Look, that's for tomorrow; do the practice.' ... I would ask them, 'Do you know how to do X?' ... I mean they should be working... 'You need to do these exercises,' 'Do *these* exercises. Don't do those ones, do *these* ones,' and I would basically... if people said, 'I've finished,' I would say, 'Right, show me.' ... so I always check." [LD]

To us, this teacher's approach of teaching by example, of rotating through the class, of requiring demonstration of practical skills are as apparent here as with the scuba diving instructor. To these academics, sequencing and structure - pedagogic knowledge - are important to their practice.

Discussion

Personal history

Previous researchers have noted teachers' propensity to draw on their past pedagogic experiences in their current practice. Lortie (1975) coined the expression "apprenticeship of observation" to recognise that whilst not apprenticed in traditional ways, people who become teachers will have had at least six years of exposure (as pupils) to "what teaching is" - and University educators will have had many more years.

Some make very strong claims for this personal history. Entwistle found that novice high school teachers claimed what influenced their teaching the most strongly was (in order) their classroom experiences as a teacher whilst on teaching practice, their previous experience as a teacher, and their own experiences as a pupil (Entwistle, Skinner, Entwistle, & Orr, 2000). Entwistle et al. proceed to suggest a "hierarchy ... leading from unexamined beliefs, to reliance on a single guiding metaphor or an undeveloped conception, and on to conceptions

at increasing levels of coherence, complexity and sophistication” (p. 20). That construction reflects their livelihood as teacher trainers and educational developers; there seems to be no independent rationale for such a progression, or even for the necessary development of expertise at all. As Benner notes in the parallel domain of nursing practice, expertise is not a given outcome, and it is not uncommon for practitioners to become “experienced, but not expert” (Benner, Tanner, & Chesla, 1996).

The teacher knowledge that we posit here, as signalled by echoes, certainly emerges from personal experience. But not to any experience, and not to experiences equally. Our interviewees said many things which did not give us an echo:

“I hated it in fact, I didn’t enjoy it at all. I can remember it really clearly, my first lecture. And I had a big mug of coffee with me, I was very nervous. I wasn’t too worried about the technical side, that was fine, but it was just terrifying, absolutely terrifying, yeah.” [LD]

“They really hadn’t learned very much and I remember talking to one of my colleagues and he said, ‘Oh yeah, that’s just like that; you’ll get used to it,’” [SB]

These recalled experiences – and many other memories – were not echoed to us in the present day, did not contribute to those teachers’ current practice.

Pedagogic stance

Echoes indicate a form of embodied knowledge. This knowledge is not the cognitive “folk pedagogy” that Bruner focusses on, nor the developed and acquired “pedagogic content knowledge” that Shulman claims (Shulman, 1987). We have tentatively identified it as a “pedagogic stance” which might usefully be characterized in Smith’s institutional ethnography terms as the “located knower” (Smith, 2005). It is important to the notion of a located knower that experiential differences lead to differences in perspective, and that these differences have epistemic consequences. That is to say that teachers cannot choose to set their pedagogic stance aside, or leave it behind. In teaching there is no separation of embodied and theoretical expertise: teacher cannot step away from *disciplinary authority* as foundation of their practice, or their belief in *targeted practice*. Yet these pedagogic stances make their separate classroom practices entirely distinctive. Although equally expert and equally effective, such educators do not behave in the same way in the classroom, you could not mistake one sort of teacher for another.

Deal-breaking behaviours

The identification of a pedagogic stance also offers an explanation for the puzzling behaviour that educators often display with regard to new materials or to changes in practice (particularly puzzling to educational researchers who want their ideas to be adopted in the classroom). The reaction to material presented – “*that wouldn’t work for me*” or its recto face “*I’d like to try that*” – is often immediate, much too fast to represent an analysis of the background and content of the proposed practice, or to be the response of an extended consideration.

These sorts of “snap decision” responses are not unique to the domain of teaching. Speaking of domestic cooks reading recipes, Kim Severson explores those “deal-breaking” aspects – idiosyncratic to each individual – that stop home cooks attempting to make the described dish. She relates her own experience:

“I was reading a recipe for apple strudel when I came to a sentence that stopped me cold: ‘If you don’t have a helper,’ it began. If a dish needs a helper, I need to move on.” (Severson, 2008)

She then details ways in which others are blocked, variously if a dish needs specific techniques, or equipment; if it is on too large a scale, or requires too fast a process; or if it brings back memories of some previous personal disaster. For one of us (Fincher) a culinary

deal-breaker would be deep-frying; for another (Dziallas) the genre of horror movies is taboo at the cinema.

It is hard to directly search for a pedagogic stance, as it is socially and experientially constructed. It is hard for individuals to articulate, because it represents *my* story, *my* history, and so is essentially – fundamentally – unsurprising to me. It is also hard to elicit a pedagogic stance directly by asking “20 questions”: 1. “Do you like comedy films?”, 2. “Do you like Westerns?”... However, we suggest that it may be though echoes that a pedagogic stance can be located, indicated in the way it permits some actions and prohibits others. Rather than being irritating and unhelpful, “deal breaking” behaviour may be seen as a diagnostic for the personal history that has formed it.

Implications

So, if we are correct, and if echoes exist and are powerful influences on teachers’ current practices, what does this mean?

On research-to-practice

Researchers have often lamented the lack of adoption of education research results in practice. Indeed, Dancy and Henderson note that “although substantial time and money has gone into developing and disseminating research-based pedagogy and curriculum, the limited evidence available suggests that these reform efforts are having only a marginal impact” (Dancy & Henderson, 2008). And an earlier study based on data collected by the Sharing Practice project found that educators rarely deliberately search for sources to change their practice. In fact, most changes occur either because of personal interactions with other educators or without any outside influence at all (Fincher et al., 2012).

Previous research has suggested that one of the aspects that precludes educators from adopting a particular change in practice is an incompatibility with their mental model. “Teachers will not teach in a particular way if it is inconsistent with their mental models of children’s minds and learning” (Strauss, 2001). Strauss takes a purely cognitive view of mental models. An example of such a mental model is the idea that students’ minds have “openings of a certain size that allow information to enter”. Consequently, knowledge needs to be presented in appropriately sized chunks and in a particular order for it to stick in students’ minds – and then learning occurs! According to Strauss, “the mental model (folk psychology), then, is the main organizing system which gives rise to how teachers’ teach (folk pedagogy).” In its cognitive form, Strauss’ conception of mental models is distinct from the definition of pedagogic stance we have outlined above, which is grounded in personal experience. However, we suggest that mental models and pedagogic stance are symmetric in the way that they both contribute to teachers’ folk pedagogy. We propose that both are revealed through deal-breaking behaviour.

On methodology

In her book on clinical narratives, Cheryl Mattingly writes beautifully:

“Theory about action is necessarily crude compared to the nuances of particular actions themselves. Theory is meant to be general, to rise (at least some distance) above any specific context which it tries to explain or interpret. But practical actions, and the considerations which prompt them, are grounded in concrete situations, situations which have never presented themselves in quite this way before.”
(Mattingly, 1998)

In her work, she found that generalizations, while necessary to establish theory, obscure the very particularities that may have prompted them. Her description of theory and action – that is, generalizations and particularities – draws on Schön’s twin concepts of technical-rational knowledge (TR), a scientific mode of thought that aims to make generalizable statements; and knowledge-in-action (KIA), a form of practical knowledge that is embodied and

expressed in practice. Jerry Floersch built on these definitions to show that a methodological focus on technical-rational knowledge limits researchers' perspectives of caseworkers' practice in social work by excluding knowledge-in-action. He claims that an approach that reduces practice to theory ultimately cannot represent practice authentically (Floersch, 2004). For us, a pedagogical stance is an example of knowledge-in-action, which cannot be elicited through solely technical-rational enquiry.

In order to elicit this kind of practitioner knowledge, an appropriate methodological approach is to use narrative, which "deals in human or human-like intention and action and the vicissitudes and consequences that mark their course" (Bruner, 1986). Dan McAdams highlights the power of a narrative approach in his description of differences in personality (McAdams, 1995). We construct stories and "weave together the reconstructed past, the perceived present, and the anticipated future" to make sense of our lived experiences (Adler & McAdams, 2007). Narratives then enable us to understand someone's conception of who they are, and how their experiences have shaped them.

"Narratives are key components in the authentic study of teaching, for until we understand the context and appreciate the perspectives of those involved, any understanding of what it means to teach and learn will remain fragmented and disconnected from the real world of teaching." (Olson, 1997)

The narrative methodologies adopted in the Sharing Practice project were, then, a particularly propitious ground for the emergence and identification of echoes. As Floersch observes, knowledge-in-action is more frequently exhibited in oral narratives, rather than written ones (Floersch, 2004), which reinforces our observation that the intersubjectivity of the interviews is a key, perhaps essential, aspect of work of this nature.

Conclusion

Floersch takes a rather violent stance on knowledge-in-action when he argues "that KIA is a profession's self-defense against a policy maker, researcher, and practitioner who aim to use TR in an absolute and objectifying fashion" (Floersch, 2004). Whilst a perspective of defense against researchers may not ultimately be productive and in fact may be part of the problem (Dancy & Henderson, 2008), it highlights the importance of understanding practitioners' knowledge-in-action. If we understand how pedagogical stance is formed, and are able to diagnose its character, we may be able to affect educators' practice more effectively.

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