Teachers and Teaching
theory and practice

ISSN: 1354-0602 (Print) 1470-1278 (Online) Journal homepage: www.tandfonline.com/journals/ctat20

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To cite this article: Gillian Peiser (23 Nov 2025): What do student teachers think and feel about educational research? The role of epistemic beliefs and epistemic emotions, Teachers and Teaching, DOI: 10.1080/13540602.2025.2593368

To link to this article: https://doi.org/10.1080/13540602.2025.2593368

Published online: 23 Nov 2025.

TEACHERS AND TEACHING
https://doi.org/10.1080/13540602.2025.2593368

Routledge
Taylor & Francis Group

What do student teachers think and feel about educational research? The role of epistemic beliefs and epistemic emotions

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ABSTRACT

This interview study, located in England, explores the role of epistemic beliefs and emotions relating to student teachers' views of research. It is based on the premise that to further understand and attend to the theory-practice divide in initial teacher education, we should look beyond contextual elements that influence views about research knowledge and learn more about different person-centred factors. It therefore studies the reasons for different student teachers' beliefs about research knowledge, which are bound up with beliefs about knowledge and coming to know (epistemic beliefs), and the related role of prior experiences. It also investigates influences on epistemic emotions, those that student teachers experience when they engage with academic coursework, and how these relate to epistemic beliefs or other factors. The findings are presented in four 'emplotted narratives', linking different elements to generate stories. The narratives reveal explanations for different epistemic beliefs and emotions and how these interact both in different combinations and with context. They also illustrate three key themes: the impact of individuals' prior academic, professional or personal experiences; the influence of contextual factors and significant others on epistemic emotions; missed opportunities to develop more availing epistemic beliefs and emotions to address the theory-practice gap.

ARTICLE HISTORY
Received 5 November 2024
Accepted 16 November 2025

KEYWORDS
Educational research; epistemic beliefs; epistemic emotions; student teachers; theory-practice divide; emplotted narratives

Introduction

This paper reports on an interview study which investigated the influence of student teachers' epistemic beliefs (views about knowledge and coming to know) (Hofer & Pintrich, 1997) and epistemic emotions (those elicited when engaging with academic activities) (Muis et al., 2018; Pekrun et al., 2016) on their attitudes to educational research. The interview study formed part of a larger mixed-methods investigation located in England, studying relationships between student teacher demographics and views about educational research. The interview component was concerned with how

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individuals' characteristics or life histories may be intertwined with epistemic beliefs and emotions and their consequent views of research.

Against the backdrop of the practicum turn in initial teacher education (ITE) (Mattson et al., 2012), extant literature has focussed on the influence of contextual factors contributing to a theory-practice divide (Korthagen, 2017) and consequent views of research. Researchers have established that many student teachers prefer directly applicable knowledge which can be accessed quickly to solve workplace issues (Tang et al., 2019), prioritising school-based mentors' contextual and transmissive knowledge over wider-ranging knowledge from various sources, including educational research and theory (Murray et al., 2019). Studies have also shown that due to their limited in-school experience, student teachers can find it difficult to see how formalised knowledge fits with what they know so far and thus may not value reseach knowledge (Hennissen et al., 2017). However, if teaching is to be a genuinely professional endeavour, whereby teachers draw on wide pools of knowledge from different sources to inform decision-making, theory and practice in ITE must be held in balance (Winch et al., 2015). Thus, this disconnect is highly problematic.

Teacher educators have responded to these challenges by increasing the focus on applied forms of knowledge for teaching. They have designed curricula that promote the integration of experiential learning and research-based knowledge, whereby school and university knowledge are interrogated in the light of each other (Burn & Mutton, 2015; Cochran-Smith & Lytle, 2009). Although very valuable, the above insights and resulting curricula, however, do not attend to issues relating to how student teachers' views may vary depending on more individualised factors.

The present study is based on the premise that to further understand and attend to the theory-practice disconnect, it is necessary to know more about how and why different student teachers' beliefs about knowledge for teaching, including research, may vary. As Merk et al. (2017) and Joram et al. (2020) argue, some of the reasons why (student) teachers do not value research are bound up with beliefs knowledge for teaching. Educational research is a source of knowledge for teaching and beliefs about sources of knowledge are bound up with beliefs about the nature of knowledge and coming to know (Merk et al., 2017), i.e. with 'epistemic beliefs' (EBs). If, furthermore, there is evidence to suggest that EBs develop reciprocally in relation to life and educational experiences (Muis et al., 2006), it is important to understand how these interact with one another to impact views about research.

Whilst a few authors have considered how personal epistemologies influence student teachers' and teachers' motivation to learn from different knowledge sources in different national contexts on a variety of pre-service and in-service courses (Ferguson et al., 2023; Guilfoyle et al., 2020, 2024; Joram et al., 2020; Merk et al., 2017), none of these have investigated how varying student demographics or life histories within the same data set may impact views. Furthermore, although learning to teach has been conceptualised as an emotional experience (e.g. Korthagen, 2017; Waber et al., 2021), the related focus has been on experiential learning rather than conceptual learning. Aside from Gold et al. (2023) and Peiser et al. (2022), there has been little attention to how the epistemic emotions (EEs) that result from appraisal of alignment between new information within educational research and existing beliefs about knowledge could also be consequential.

This study therefore seeks to make a contribution to knowledge by firstly investigating how EBs impact student teachers' views about research and the influence of demographics or prior experiences in this process. Secondly, it aims to discover how EBs or other factors may elicit different EEs and the effect these have on opinions about research.

In this investigation, the author conceptualises 'engaging with research' as referring to a broad range of practices, reflecting that research experiences in ITE can take on a wide variety of forms (Guilfoyle et al., 2024), which is also true in the English context. These may include learning about empirical studies and educational theories through lectures and seminars to promote research-informed pedagogies and coherence between theory and practice, or more student-centred activities through directed study, coursework in the practicum, or more traditional academic coursework. It may also include action research, where students not only engage *with* research, but also engage *in* research to improve their own practice and develop research literacy. Research engagement activities can also vary depending on the academic level (under- or post-graduate) of the qualification.

This paper will provide a review of the literature on EBs and EEs, considering also how these frameworks are relevant in teacher education. In the review of EEs, it will focus particularly on their antecedents and the role of emotions in meaning-making and conceptual change. It will then outline the methods and data analysis process, explaining the author's rationale to present the key findings as 'emplotted narratives' (Polkinghorne, 1995). Finally, it considers the implications of the results for ITE curriculum development.

Literature review

Epistemic beliefs (EBs)

EBs are defined as theories and beliefs individuals hold about knowing, how they come to know, and the way in which beliefs influence cognitive thinking (Hofer & Pintrich, 1997). The research in this field can be broadly categorised into three waves. The first focusses on an individual's stage of cognitive development with a unidimensional model (Perry, 1970), the second wave gave rise to multi-dimensional models (Hofer & Pintrich, 1997; Schommer, 1990, 1993), whilst the third highlighted the influence of socio-cultural factors (Hofer, 2016). Developmental models in the first wave were largely influenced by the work of Perry (1970), who explained that students hold more simplistic and absolutist beliefs about knowledge at a younger age but that these become more sophisticated as they mature and progress through education. His four-stage model comprised: dualism (absolutist views of knowledge), multiplicity (recognition of diversity of possible answers, but searching for the 'right' answer), relativism (acknowledgement of contextual influence and the self as meaning maker), and commitment within relativism, with responsibility and engagement. Perry's (1970) model, however, was critiqued since it was derived only from data collected from white, male students at Harvard University. It also started to reveal limitations in providing explanations for academic performance (see Hofer & Pintrich, 1997).

In the second wave, Schommer (1990, 1993) and Hofer and Pintrich (1997) proposed multi-dimensional models, illustrating how different dimensions of beliefs about knowledge can independently impact knowing. Schommer set out to test whether five different dimensions of EBs may have individual effects on academic performance of university (1990) and high school (1993) students, problematising the unidimensional nature of a developmentalist model. Grounding her work on Perry (1968), Schommer's first three dimensions included beliefs about: (1) knowledge stability (fixed or fluid), (2) knowledge structure (separate or connected) and (3) source of knowledge (handed down by authority or derived from reason).

Regarding the first dimension, people with more fixed beliefs about knowledge would be unlikely to doubt its certainty and believe that it stays stable over time. Somebody who espouses more fluid beliefs of knowledge, contrastingly, would recognise that it may be questionable and be revised over time. In relation to the second dimension, those who view knowledge with a simplistic structure may consider different aspects of knowledge to be discrete, whereas those who have connected views about knowledge recognise interrelationships. Thirdly, beliefs about source of knowledge relate to the extent to which an individual is prepared to evaluate knowledge and become involved in a process of knowledge construction.

Schommer also tested dimensions relating to (4) beliefs about speed of learning and related effort and (5) academic ability. The results of Schommer's studies (1990, 1993) indicated that each dimension, apart from the latter, impacted academic performance. Students who viewed knowledge as fluid, connected, placed importance on evaluation, or were prepared to engage in effortful learning over time had more 'availing' EB(s) for academic success as each was associated with stronger academic performance. Schommer's work made an important contribution to the field and has been regularly implemented in studies on EBs around the world (Schommer-Aikins, 2004).

The author proposes that Schommer's framework (1990, 1993) can illuminate the value student teachers attach to research. This is because those who favour a more dynamic and complex view of knowledge, are prepared to critically involve themselves in knowledge construction, and are committed to effortful and deep learning, are more likely to view learning to teach as an 'intellectual endeavour'. As Winch et al. (2015) contend, teaching as an 'intellectual endeavour' extends beyond reliance on procedural and contextual knowledge gained through practical experience. It places importance on integrating and evaluating conceptual and practical knowledge to underpin educational decisions and thus values the contribution of educational research and theory.

A third wave of research (Hofer, 2016) emphasised the social dimension of knowledge, whereby domain specificity (related to experiences of a particular field of knowledge/study), society, socialisation or community play a role in belief construction. This is illustrated by Hofer's study (Hofer, 2000), which investigated differences between natural science and social science students and females and males. Students majoring in science were significantly more likely than those in social science to view truth as attainable, and men were more likely than women to see knowledge as certain and unchanging. Others have studied the influence of gender, establishing that females' beliefs, for instance, favoured 'connected' and empathetic knowing (Belenky et al., 1986).

Growing attention to socio-cultural influences on beliefs is also evident in Schommer-Aikins (2004) 'embedded systemic' model which illustrates the influence of family,

teachers, peers, community, and broader culture to extend her earlier model (Schommer, 1990). Similarly, Muis et al. (2006) developed a Theory of Integrated Domains in Epistemology (TIDE), indicating how EBs are reciprocally influenced by both life and educational experiences. Collectively, this third wave of studies indicates how EBs related to student teachers' background characteristics or prior socialisation may also shape their views about educational research.

EBs in teacher education research

The teacher education literature has also considered the relevance of epistemic issues. Until recently, researchers focused more generally on how STs' epistemologies relate to views on pedagogy, or the extent to which EBs are 'availing' for learning to teach (e.g. Bondy et al., 2007; Muis, 2004; Therriault & Harvey, 2013). However, in considering knowledge for teaching in a broader sense, i.e. to also include views about sources of knowledge, some studies have investigated relationships between EBs and views about research. For example, Joram et al. (2020) found that in-service teachers' EBs influenced their 'buy-in' to use educational research. Teachers who favoured knowledge certainty and were concerned about its generalisability were less likely to draw on it to inform their practice, especially if they thought findings or theoretical concepts lacked applicability in their own contexts. Interestingly, however, Joram et al. (2020) discovered that the medium of communication of research was also important. If it was known that other teachers in the school were able to tailor research knowledge to the specific context and pupils, it created greater certainty. Thus, the medium of communication can be viewed as a sub-set of certainty.

Löfström and Pursiainen (2015) and Guilfoyle et al. (2020, 2024) established that student teachers find it challenging to grapple with knowledge rooted in contrasting epistemologies, e.g. positivist theories in maths and natural science compared to educational theories that provide frameworks for understanding rather than certainties. In their study about student teachers' learning about assessment, Yough et al. (2023) found that those with more fluid EBs were more likely to connect conceptual learning with field learning in the practicum. Ferguson et al. (2023) revealed relationships between student teachers' beliefs about sources of knowledge for teaching and motivations to learn from different sources.

Within teacher education research, studies on EBs also reveal the influence of sociocultural factors. Whilst Chai et al. (2006) and Wong et al. (2009) found that most respondents held EBs that corresponded with deep and achieving-oriented learning approaches, Bondy et al. (2007), Guilfoyle et al. (2020), Muis (2004) and Therriault and Harvey (2013) uncovered widely variable beliefs within their data sets. The former group of researchers, located in Hong Kong and Singapore, interpreted their results in relation to Confucian culture. In contrast, the latter group, located in Western countries, concluded that views about knowledge for teaching were filtered by students' entering perspectives, personal priorities, and prior academic learning. This literature thus further justifies the need for more research about relationships between EBs and student teachers' views of research and why it is important to consider prior experiences as part of this equation.

Epistemic emotions (EEs) and their antecedents

EEs (e.g. enjoyment, interest, curiosity, frustration, anger, confusion, anxiety or boredom) connect with EBs since they result from appraisals about degree of alignment between new information and existing beliefs and knowledge structures (Muis et al., 2018; Pekrun, 2021). More specifically, appraisals will relate to learners' beliefs and feelings about novelty, complexity, value, and their feelings of control (Pekrun et al., 2016) which serve as antecedents for EEs. EEs have been conceptualised with reference to Pekrun's (2006) control-value theory; control relates to perceptions of efficacy to manage a task, and value is associated with motivation to invest effort. When value is deemed high, students are more likely to experience positive emotions. Muis et al.'s (2015) study on EEs extended Pekrun's theory to consider congruity with existing knowledge and knowledge structures. Their findings indicated how appraisals of novelty may be influenced by prior experience and how EBs also serve as antecedents for EEs.

These studies paved the way for Muis et al.'s (2018) model which attributed the antecedents of control, value, novelty, complexity and achievement/impasse in epistemic aim to the elicitation of different EEs. More recently, Pekrun (2021) highlighted the influence of cognitive quality afforded by the educational context in impacting control value antecedents. Additionally, Pekrun indicated that the emotional and motivational quality of learning activities can be impacted by views of others about the task(s), which in ITE may relate to teacher educators and, or mentors in the practicum.

Whilst there has been much attention to the emotional element of learning to teach from an experiential learning perspective (Korthagen, 2017; Waber et al., 2021), there has hitherto been little focus in ITE on student teachers' EEs associated with the cognitive processes when they engage with research and theoretical knowledge. Peiser et al.'s (2022) study, however, demonstrated how student teachers valued research and perceived greater control when reading studies relating to their specialist teaching subject. Not only were they intrinsically interested but also extrinsically motivated to apply research findings to practice. Due to existing subject specialist knowledge (having completed undergraduate studies in the subject), they appraised the research literature more positively and expressed emotions of interest and enjoyment. When educational theory or research was abstract, unrelated to existing knowledge, and students were unsure about its practical value, they experienced emotions of frustration. It is worth noting, however, that the consequences of emotions are not always straightforward. For example, if extrinsic value is strong, this can override antecedents that may typically result in negative emotions (Pekrun, 2021).

Further arguments for paying attention to student teachers' EEs come from the work of Zembylas (2005) and Jaber et al. (2018). Zembylas (2005) stresses the importance of considering the role of emotions and their interplay with cognition in meaning-making and conceptual change when taking a socio-constructivist approach to learning. Referring to Pintrich et al. (1993), he highlights how value and control beliefs are mediators in the process of conceptual change. Whilst Zembylas' work related to science education, it is relevant to how student teachers develop their professional knowledge. As claimed by Korthagen et al. (2006), teacher education is a subject to be created rather than a created subject. It follows therefore that beginning teachers should be central in the meaning-making of knowledge for teaching. The extent to which they consider

educational research as a knowledge source in this process could also depend on the interplay of emotional mediators and cognition. Jaber et al. (2018) similarly argue that epistemic activities are both cognitive and emotional experiences and thus teachers should have epistemic empathy. The author purports that this principle could equally apply to epistemic activities (involving research engagement) in teacher education and accordingly, there may be a need for epistemic empathy from teacher educators.

Methodology

The empirical study

The mixed-methods study was originally prompted by Peiser et al.'s (2022) investigation, revealing how aspects of student teachers' prior socialisation (gender and academic experience) influenced opinions about educational research and the emotions they experienced whilst engaging with academic assignments also impacted views. One of this study's limitations, however, was that it collected data from students in only one university, all qualifying to teach in secondary schools. The participants in the present study came from various courses in different universities across England and therefore provided a more diverse sample.

Whilst to some extent the interview element of the study aimed to provide explanations for the trends relating to correlations between demographics and views emerging from the survey data ($n = 376$) (Peiser et al., 2025), the relatively small number of participants ($n = 14$) cannot provide direct 'representation' of the different demographic groups. Thus, the qualitative component of the study reported here was principally concerned with gaining a holistic understanding of the reasons for students' different and developing EBs and EEs, and how these in turn may impact views.

Sampling and recruitment

The interviewees ($n = 14$) were recruited via self-selection through the survey study. All data were collected between spring 2022 and summer 2023, at times when student teachers on different courses would have had enough exposure to educational research and theory to have developed a view. On PGCE[1] courses, they had already experienced the majority of research-related teaching and learning activities organised by the university, although may have still been required to complete academic coursework. An inclusion criterion for undergraduate participants was that they were in their final year of study. Thus, they would have already had substantial input from the university. Since research experiences on different ITE courses vary, so would those of the participants.

Students on different ITE courses were invited to participate in the survey via email invitations sent by the author to tutors and course leaders of eighteen ITE providers known through her membership of professional networks, who forwarded these to students. The students in the different providers were on a variety of undergraduate (primary) and postgraduate courses (primary and secondary with different subject specialisms). Recruitment adverts were also sent to three national ITE professional organisations, which were published on newsletters and social media posts. Whilst forty-eight survey respondents provided contact details, only fourteen followed through with

Table 1. Demographic profiles of interviewees.

Interviewee	Gender	Mature student? (aged 26 +)	ITE Course + specialism (where appropriate)	ITE provider location in England	Career changer?	Previous study (degree(s) or A Levels)
1	male	yes	Postgraduate secondary history	Greater London	yes Journalist	International history and politics
2	female	yes	Postgraduate Primary	Greater London	yes Unqualified primary teacher	Primary Education accelerated degree
3	male	yes	Postgraduate secondary computing	Greater London	yes Software engineer	MSc Engineering
4	female	yes	Postgraduate secondary English	North	yes, 'Corporate job'	Arts degree
5	female	no	Postgraduate secondary science	North	no	Pharmacy
6	female	no	Postgraduate secondary English	North	no	English
7	male	no	Postgraduate secondary science	North	yes Postgraduate researcher	Embarked on PhD which did not complete. Exited with MPhil Science degree
8	female	no	Undergraduate Primary	Midlands	no	English, Psychology, and Geography A Levels
9	female	no	Undergraduate primary	South West	no	Maths, Further Maths, Physics and Philosophy and Ethics A Levels
10	female	no	Postgraduate primary	North	no	Ancient history and history
11	female	no	Postgraduate secondary science	North	no	Psychology
12	female	yes	Postgraduate primary	North	yes Counsellor/ therapist	English language
13	male	yes	Postgraduate primary	North	no	Psychology and criminology, followed by Masters in neuroscience
14	male	no	Postgraduate secondary geography	North	no	Film production

interviews from a total of nine different ITE providers. The demographic profiles of the interviewees can be found in Table 1.

The author interviewed all participants, who, except for participant twelve, she did not personally know, teach or supervise in a university teacher educator role in the practicum. The interviews lasted approximately forty minutes and were conducted on Microsoft Teams. The study was granted full approval by the author's university ethics committee (22/EDN/001) before commencement of data collection and all participants gave full informed voluntary consent. The interviewees were assured of confidentiality and anonymity. They were also informed that their honest

views, if they felt comfortable to express them, rather than comments that might 'please' the interviewer, were most welcome, to give them voice.

Data collection

The interview schedule was drawn up based on the Schommer (1990, 1993) framework of EBs and Muis et al. (2018) model on the antecedents of EEs (herewith AEEs). Interviewees were asked about their views of research on their ITE courses in terms of their interest (AEE: intrinsic value), relevance for practice (AEEs: extrinsic value and fulfilment of epistemic aim), comprehensibility (AEE: complexity). They were asked what types of knowledge they drew on more regularly (e.g. advice from mentor, insights from research), whether they used research knowledge to inform practice, how they responded to research literature with conflicting views or conflicts between mentors' views and research, and how confident they felt about completing academic coursework (EBs: knowledge stability, knowledge structure and source of knowledge and AEE: control). Additionally, they were asked about previous academic experiences and were prompted to reflect on how these may impact views (EB: knowledge stability and AEE: novelty). Finally, the interviews enquired about preparedness to devote time to reading texts (EB: speed of learning and effort) and confidence to be critical of research studies or theories (EB: source of knowledge). The video recorded interviews and auto-generated transcripts were downloaded from MS Teams and the transcripts were checked and edited for accuracy.

Data analysis

Wave 1

The initial data analysis involved deductive coding using NVivo software with EB codes from Schommer's framework (1990, 1993), AEE codes from Muis et al. (2018), and an additional code of 'prior experience'. This was carried out by three people (the author and two research assistants). The first four interviews were coded collaboratively to develop a common understanding, and then each research assistant individually coded five of the remaining ten transcripts. Anomalies were discussed and resolved in the team.

In the resulting NVivo project, the AEE codes contained one hundred and eighty-seven references compared to the EB codes, containing eighty-three references. The 'prior experience' code had forty-six references. Whilst this distribution insinuated greater importance of AEEs than beliefs and an important role of prior experience, the fragmentation of data in numerous codes did not provide a holistic or particularly coherent picture.

Wave 2

To develop a deeper understanding, the team returned to the transcripts looking for key themes and 'stories' both across the larger data set and pertaining to individuals. This second wave of analysis revealed three cross-cutting themes. The first was the relationships between individuals' prior academic, professional or personal experiences and interest in educational research. Whilst generally there was a relationship between students' positive reception of educational research and enjoyment of prior academic

work, which had involved considerable reading of (academic) texts (interviewees six, seven and eleven), some specific prior experiences manifested in particular research interests. For example, students who had specialised in sciences at undergraduate level had preferences for research with 'hard data' (interviewees three, five and seven). One who had a career in psychotherapy (interviewee twelve) was fascinated in research on dialogic learning, a previously 'unqualified' primary teacher wanted an underpinning rationale for her practice to develop her professional identity (interviewee two), whilst interviewee fourteen, who talked about difficult experiences with his parents, was interested in therapeutic behaviour management. This illustrated that when educational research that students read or encountered was on a familiar topic or resonated with personal motivations, they were more likely to experience EEs of enjoyment, interest or value. A second theme was the influence of contextual factors on EBs and EEs, in particular, significant others for students on their ITE journey (interviewees one, four and five). The third theme was the stark disconnect between knowledge from educational research and practical knowledge for teaching (interviewees eight, nine and ten), principally resulting from the perceived absence of value. During the second wave of analysis, the author wrote summaries of each research interview, in which the research team discovered story-like qualities in individual accounts (Earthy & Cronin, 2008). This process, taking a more holistic approach, also began to reveal 'emplotted narratives' (Polkinghorne, 1995).

Emplotted narratives emerge when a plot is discovered or developed displaying 'the linkage among the data elements as parts of an unfolding temporal development' (Polkinghorne, 1995, p. 15). In discovering the plot, attention is needed to cultural context; the embodied nature of the protagonist; consideration of significant others in affecting actions and goals; the choices and actions of the protagonist relating to their motivations and interests; and acknowledgement that people are historical beings (Dollard, 1935, as cited in Polkinghorne, 1995).

Polkinghorne (1995) advises researchers to draw on disciplinary expertise in interpreting and making sense of protagonists' actions and responses, which was enabled by drawing on the coded elements of EBs and AEEs from the first round of analysis. The 'novelty' aspect in Muis et al.'s (2018) framework also helpfully attended to the students as historical beings, whilst Pekrun's (2021) reference to the impact of educational context and significant others on EEs aligned well with other factors highlighted by Polkinghorne (1995). Thus, the coded elements from Wave 1 were used in combination with factors highlighted by Polkinghorne (1995) to develop narrative profiles.

Since it is beyond the scope of this article to present all fourteen profiles, four emplotted narratives are presented illustrating the cross-cutting themes outlined above. The first theme—the impact of individuals' prior academic, professional or personal experiences—is represented in two profiles since it related to a large number (half) of the interviewees with some nuanced differences within: Profile one 'I'm a science head … I like facts and figures' demonstrates the influence of particular prior academic experiences. Profile two 'I want to understand it before I am confident to teach it' illustrates how a combination of prior professional and educational experiences impacted views. The second theme—the influence of contextual factors, in particular, significant others—is portrayed in Profile three: 'Excitement of learning something new turns into a bad joke'. This profile reveals how for some students,

contextual factors and significant others can become stronger influences on views than prior experiences and may even change EBs and EEs. Finally, Profile 4 'I'm reading and reading to find one sentence' corresponds to the third theme: the disconnect between research knowledge practical knowledge for teaching. This last profile also reveals missed opportunities in ITE to develop 'availing' EBs and positive EEs.

Whilst each profile has a different emphasis, they collectively serve to demonstrate how students' views of research can be affected by different combinations of EBs and AEEs, how they interact with biography, and to greater or lesser extents, context. The author does not purport to generalise from these narratives. Rather, she hopes that by linking the various elements, the generated stories provide explanations. As argued by Polkinghorne (1995), the adequacy of the narrative can be judged according to its plausibility. The EBs and AEEs, drawing on Schommer's (1990, 1993) framework, Muis et al.'s (2018) model and Pekrun (2021), together with aspects from Polkinghorne (1995) are highlighted in bold font. All names are pseudonyms.

Findings

Profile one: 'I'm a "science head" . . . I like facts and figures': the impact of a particular prior education (Ruth, interviewee 5)

Ruth was a pharmacy graduate, who embarked on a postgraduate ITE course for secondary science teaching immediately following her degree. Her **scientific academic history** seemed to play a pivotal role in how she viewed educational research. Research was able to show her 'what works' with cause and effect.

> Like when I started doing my first assignment after my first placement, I realised, ok. This actually makes a lot more sense now to why these things are working in class. Because there's actual research behind it to back it up.

She explained how 'it's literally just because like, I think maybe it's because I'm a 'science head', and I like facts and figures to back me up'. Ruth seems to **favour stable knowledge generated by others**, in contrast to more fluid knowledge where she would need to involve herself in knowledge construction. Additionally for Ruth, research was both **intrinsically and extrinsically valuable**, as well as serving an **epistemic aim**:

> When I sat down and actually started reading educational research that I used for that first assignment, I was like, ok. And I started to bring in those practices [suggested by the research] in my demonstrations. And like, I was connecting them [the demonstrations] with what we were learning and lectures and it actually started to make sense and it was helping my teaching.

However, Ruth seemed less enthusiastic about **complexity** in educational research, from both textual and substantive perspectives. 'Obviously educational research still feels a bit daunting [. . .] It's got a lot of jargon and it's hard to read sometimes.' She seems to have side-stepped substantive complexity and potential feelings of frustration by sourcing reading with 'clear-cut' recommendations for practice (with a **more simplistic knowledge structure**), rather than considering a variety of perspectives:

> I think most scientific people do like research backed up to things so that you're not just doing something because you think it works. Like you actually want, like, some proof behind it that it does work. And with the likes of 'Rosenshine's Principles', there's a lot of proof behind as to why that sort of teaching works. That's why I can get behind it . . . that tiny little book. Like Tom Sherrington's definitions of the 'Rosenshine's Principles'. This is way easier to read, and I like to read it on my commute to work.

When it comes to critically evaluating ideas from research, Ruth appears challenged by **knowledge fluidity** or more complex **knowledge structures**.

> There's a lot of really strongly opinionated articles that you should have. It's not as simple. I feel like scientific articles are simpler to wade through [. . .] So usually everything I do would be backed up by facts, by figures, by graph showing things.

Interestingly, however, when her **mentor or somebody in her placement school (a significant other)** sent her something to read, she was more certain of its **value**.

> Someone that I'm talking to knows that an article that can help me. So they share it with me and usually whenever someone that I know sends me an article, I'll actually take it in because then like if I respect them as a teacher. I'm like, ok, this must be a good article that they're sending me, or I'll actually sit down and read this tonight because, like, it must be good.

Ruth's EBs developed during her undergraduate studies seem to have translated into the field of learning to teach. She views educational research favourably if it is 'clear cut', provides her with a 'what works' basis for practice, and it is considered worthy by those she perceives to have authoritative knowledge. Ruth has mostly encountered research which has resonated with her beliefs, consequently eliciting EEs that result in 'buy-in' of educational research. On the one hand, Ruth's enthusiasm is fortunate given that Guilfoyle et al. (2020) established that science teachers' EBs can present barriers to valuing educational research. On the other, there are limitations on relying on a particular type of research.

Profile two: 'I want to understand it before I am confident to teach it': the combination of prior academic and professional experiences (Lorraine, interviewee 2)

Lorraine had completed an undergraduate degree in Primary Education (without qualified teacher status) and prior to that, had worked as an unqualified primary teacher. She was now completing a PGCE course in primary education, which was motivated by her interest in gaining a deep understanding about the basis for practice. For Lorraine, research had both **intrinsic and extrinsic value**:

> I want to know something. I want to understand it before I can feel confident to say I'm happy to go and teach [. . .] It's a kind of a personal thing for me because prior to the course, one of the reasons why I did the course, the PGCE, is because I used to work in a primary school. I was an unqualified teacher for about three years, and there was always this feeling of, like, well, I'm sitting amongst teachers in the staffroom, but I don't necessarily understand what they're talking about [. . .] For me, it's important for me to understand well, actually, I've read this, so I understand it this way [. . .] I want to be able to offer something you know, and not just be passive.

Rather than simply accepting or reproducing practices endorsed by others, Lorraine had a strong desire to actively **engage in the construction of her professional knowledge**. Whilst research engagement did not fulfil **current epistemic aims**, due to pressures to conform to the pedagogical practices in her current placement school, she recognised how it would be helpful in her work in the future. She had alternative ideas about how she would organise her own future classroom and teaching: 'So you might not get time to practise it. You definitely see what you don't like, and you compare it to what you've read, and you think how you might apply it later.'

The **intrinsic value** attached by Lorraine to research was strong enough to withstand potential negative reception from **significant others** such as school mentors or even sceptical comments from her mum, who was an experienced teacher. She seemed more impressed by the arguments made by her PGCE tutors, who she respected as academics in a research-intensive university, indicating strong **motivational quality of her educational context**. It is also likely, however, that her interest was ignited by her previous experience working in a primary school and during her undergraduate degree. These earlier experiences are likely to have aligned with new knowledge (hence with **low novelty**) presented on her course. They also helped her to appreciate the **connected nature of different knowledge sources**.

> I think the primary education undergraduate really prepared me well for some of the ideas, especially like the seminal work I might have engaged with. [. . .] Because of my course before, I kind of understand where things fit in and how they are layered or you know, joined or connected.

Lorraine's commitment to playing an active part in **constructing her personal knowledge** for teaching, coupled with antecedents that elicited and sustained EEs of interest and enjoyment resulted in very favourable attitudes to research.

Profile three: 'excitement of learning something new turns into a bad joke': changing epistemic emotions due to contextual pressures and significant others (Paul, interviewee 1)

Paul was a mature student whose first degree was in International History and Politics. He had a former career as a journalist and was studying for a PGCE in secondary history. Paul's enthusiasm for academic research was significantly higher at the beginning of the course when he engaged with the pre-course reading. He remarked how it was 'a really interesting voyage into a completely sort of fresh area.' Despite initial interest, openness, and the **intrinsic value** he attached to learning about fresh perspectives, he explained that 'what changes, is that your time runs out and so suddenly you're pitched into teaching'. The initial emotions of interest and curiosity started to diminish and were replaced by frustration and anger as he grappled with the balancing act of the practicum demands and academic work.

> It starts to feel a bit like a bad joke, in as much as there's good stuff in some of those papers and there almost certainly is not [. . .] I've got a lesson plan to do, and I want to nail down some aspect which has been recommended in the articles recommended to help me do that, and yet, well, I'm doing is wading through fifteen pages [. . .] that doesn't come to

> a particularly practical conclusion. For the hard pressed PGCE students, panicking slightly that they are not going to be able to nail their next lesson, it's, it can feel a bit much.

The main frustration seemed to arise from his feeling that the research text did **not fulfil an epistemic aim**. He explained that his undergraduate studies prepared him to consider and evaluate contrasting perspectives, implicating his appreciation of **knowledge fluidity** and feelings of **control** in handling text **complexity**. His irritation seemed linked the absence of a practical application in the research or theory. He recounted how he was 'scribbling in the margins—'What you talking about? Or how on earth will this work in practice?'' He perhaps felt a heightened sense of frustration due to the paucity of solutions in the texts to pressures coming from a **significant other** (his mentor), who had been critical of his allegedly teacher-centred approach.

Nonetheless, if he thought educational research was able to fulfil an **epistemic aim**, thereby creating **extrinsic value**, Paul's response was more tempered:

> In the early days I dipped into it quite a bit from something like Lemov's *Teach Like a Champion*, which is intensely practical. He's underpinned by sound pedagogical analysis, and I think has a lot of credibility in terms of what it delivers, but it's couched in a very practical way.

Interestingly, his interest in research was later revived by participating in an 'academic focus group' in his placement school, illustrating again the influence of **significant others**, where a research article was related to practice:

> The practical setting for discussing that reading, I think made it feel much more real. I mean, it was just a better piece of research as well [compared to] six pages of caveats on research methodology and you're thinking, just tell me what the answer is. You know I, uh, you just want to jump to the meat, really.

Here we see however, how it was not only the **antecedent of fulfilment of epistemic aim** that influenced Paul's emotions, but also how the **emotional and motivational quality** of the reading was impacted by views of others (Pekrun, 2021). It is possible that school colleagues created certainty for Paul about its relevance, revealing his uneasiness with **fluid or tentative knowledge** in the domain of education without practical exemplification. Whilst Paul embarked on his ITE course with an appreciation of knowledge fluidity and complex structure (albeit in the domains of history and politics) and willingness to critically engage with educational research, various contextual pressures and emotions resulted in an interest limited to material with quicker—fixes for solving localised issues.

Profile four: 'I'm reading and reading to find one sentence': missed opportunities to develop availing beliefs and positive emotions (Tina, interviewee 8)

Tina was an undergraduate who started her ITE course immediately after completing secondary school. She found it enjoyable to discuss ideas from research face-to-face with her peers at university but became less interested when tasked with reading on her own. This reveals the influence on emotions of the **cognitive quality afforded by the educational context** (Pekrun, 2021).

> I think I find it more enjoyable when you're with other people and like talking about it, but there is a lot of like independent study to be done [. . .] You do it by yourself, it's not very like

> collaborative. So when you're actually in university and you're like having the debates and questions or talking about research or a theorist, I find that really enjoyable when you've got other people, and I could read something and I could interpret that differently to how somebody else reads that and then it's nice hearing what they think [. . .] Whereas when you're on your own, it just feels like ugh I'm just reading, kind of thing [. . .] it's just so boring.

Tina was also sceptical about investing time and effort in reading for the sake of academic assignments: 'Like, I feel like I'm just sat there reading and reading, to find just one sentence that's required. And I think I've just read so much to get not much back.'

Whilst Tina expresses potential **personal involvement in collaborative knowledge construction** and **intrinsic value** she may attach to research if this had come more to fruition, its **extrinsic value** was low. It did not fulfil an **epistemic aim** in informing the judgements she made about pedagogical practice. Thus, she perceived a distinct disconnect between knowledge from educational research and practical knowledge for teaching.

> Like when I'm on placement and I'm like teaching and like doing things, I'm not, like, thinking, oh hang on a minute, this is like Bandura, this is the social learning theory. It just kind of comes to you naturally.

The structure of her undergraduate course seemed to mitigate against promoting research relevance, demonstrating the importance of a carefully considered ITE curriculum sequence. Tina needed to write an assignment in May about her experiences on placement in October. She was reading research simply to jump through academic hoops rather than to inform her pedagogical practice.

Nonetheless, whilst Tina did not use pedagogic theory to underpin lesson planning, she realised that theories could provide relevant frameworks when reflecting on practice post-lesson: 'And then like, when I've looked back at like my lesson plans and things, I'm like, oh that's actually 'so and so' [thinking about a theorist]'. It is possible, therefore, that Tina may appreciate the value of research more in the future, when she has more practical experience to resonate and integrate with conceptual knowledge, highlighting the temporal elements in her story.

The logistical separation of theory and practice (**cognitive quality of educational context**) in her ITE course sequence, however, more frequently led to a mental separation with a more simplistic view of **knowledge structure**: 'Sometimes I feel like I've just got to do what I've got to do at uni, just to get the degree'. However, the limitations of research in fulfilling an **epistemic aim** also appeared related to fear of negative judgement about it by a significant other (mentor). As a younger beginning teacher (her **embodied** self), she had a heightened sense of lack of experience.

> I feel like we could [try out ideas from research in practice] but then I don't know, because we're young [. . .] We are not actually like teachers yet. But I feel like if I wanted to try something new, it would kind of be like . . . Well, what does she [referring to herself] know? She's not very experienced kind of thing.

Tina's beliefs about **knowledge structure** and her role regarding **personal involvement in knowledge construction** still seem to be developing. These tentative beliefs may be related to the fact that she is both an undergraduate and younger student (Perry, 1970). Whilst there is potential for Tina to view research as intrinsically valuable, her current

attitude seems to be one of ambivalence due to **low extrinsic value** and **absence of epistemic aim**.

Discussion

The interview study sought to generate a holistic understanding of the reasons for student teachers' different EBs and EEs, and how these in turn may impact views about research. The first key finding was the influence of prior experience on beliefs, emotions and views of research. Ruth, who had studied natural sciences, favoured stable knowledge. She preferred educational research involving 'hard data' to provide an evidence base for practice and experienced interest when engaging with research of this type. Lorraine, who had studied Education as an undergraduate and had already worked as an 'unqualified' teacher, appreciated the value of connected knowledge that cohered practical and conceptual elements and experienced emotions of enjoyment, interest and curiosity, also due to its resonance with her existing schema. Paul embarked upon ITE with an openness to new perspectives and an intrinsic interest in reading educational research, possibly due to his prior studies and career in journalism. However, these diminished due to the pressures of teaching practice where the need for research to fulfil an extrinsic purpose and school colleagues' views took precedence. Tina tended to view knowledge in separate silos rather than in an integrated and connected way, possibly because she was still at undergraduate level and her EBs were still developing. Her confidence about the value of different knowledge sources was also challenged by fear of scepticism from more senior others in the school context. However, it seemed that the design of her ITE course also created obstacles in promoting research relevance, ultimately resulting in an ambivalent attitude.

Whilst it is not possible to claim that these findings can be generalised to a wider population, they serve as examples of how differing prior experiences impact EBs and interact with (A)EEs to influence student teachers' views of research. Thus, the findings echo research in educational psychology that has highlighted how EBs are shaped by social and cultural factors (Hofer, 2016) and that EBs connect with EEs (Muis et al., 2018). As such, the findings contribute to theoretical knowledge in that they extend the field of educational psychology, where research has historically focussed on relationships between academic attainment and self-regulated learning, by uncovering how the interplay of EBs, AEEs and socio-cultural factors also impact (beginning) teachers' professional learning. The present study's findings also lend theoretical weight to the work of Joram et al. (2020), Merk et al. (2017), Ferguson et al. (2023), and Guilfoyle et al. (2020, 2024) in teacher education, who have demonstrated the relationship between EBs and views about different sources of knowledge for teaching. The results of this study also imply, that consideration of EBs alone in this relationship is insufficient. EBs should be considered in combination with individuals' prior experiences, (A)EEs and sometimes contextual factors.

The second key finding to emerge was that whilst the study revealed how EEs can be affected be factors that exist prior to ITE, they can also be elicited due to factors *during* (added emphasis) ITE. The data pointed to the influence of workload intensity, responses to particular types of texts, curriculum sequencing, and views of school mentors or university tutors. Theoretically speaking, this underlines how (A)EEs in ITE can be

strongly impacted by the cognitive quality afforded by the educational context and significant others (Pekrun, 2021). A related and notable finding here is also the influence of the medium of communication (Joram et al., 2020). When school colleagues tailored research information to specific contexts, this created greater certainty for students, illustrating how EEs and EBs favouring knowledge stability are intertwined. Whilst the teacher education literature has indicated that learning to teach is an emotional experience (e.g. Korthagen, 2017; Waber et al., 2021), this study contributes new theoretical understanding about how emotions are associated with conceptual learning as well as experiential learning.

What does this imply for ITE curriculum development and pedagogy? As EBs are malleable (Muis, 2004), teacher educators could use knowledge about possible reasons for variability of beliefs, with attention to prior experiences, to develop more positive reception to or critical understanding of different types of research. For instance, as recommended by Guilfoyle et al. (2020), student teachers specialising in science may need support to cross boundaries of disciplines of knowledge to appreciate the value of different kinds of research. Teacher educators should also be aware of and be attentive to how prior experience (or lack of it) may equip some student teachers with stronger skills and confidence to critically engage in the construction of their professional knowledge, drawing on different pools of knowledge, than others. The study's findings therefore offer teacher educators a theoretical understanding of the role that prior experiences have on EBs and EEs and the parts they collectively play in the learning process.

ITE should also be mindful of the influences on EEs whilst learning to teach. Not wishing to underplay the significance of workload pressures in intensive English PGCE programmes, this broader policy issue is beyond discussion in the scope of this paper. However, the finding relating to students' responses to 'complex' vs. 'simple' or seemingly irrelevant research literature implies the need for carefully scaffold research engagement with a variety of types of publications to buffer frustration about complexity, control, novelty, and relevance (Rosman & Mayer, 2018). In parallel, however, ITE should not shy away from encouraging open discussions about such frustration to develop more resilient responses, especially since as future educators they will be responsible for developing positive mindsets of their own students (Peiser et al., 2022).

To promote research relevance in teachers' professional learning, there has already been much attention to the value of inquiry learning and coursework that guide student teachers to adapt theoretical knowledge into practice and interrogate this knowledge considering practice. Notably, there was very minimal mention in the interviews of inquiry learning of this particular type. An absence of this could have contributed to perceptions of irrelevance, strengthening the case for further attention to inquiry learning. This finding could also suggest that 'engaging *in* research', a more proactive form of teacher research (see reference to action research in the Introduction), is becoming less prevalent in English ITE programmes and the related reasons warrant consideration. However, interviewees' lack of experience of engaging in research may also be a limitation of the present study. It is possible that some participants would have expressed different EBs and EEs, had they been given the opportunity to be more proactive student teacher researchers.

Returning to the implications of (A)EEs for ITE pedagogy, aside from the work of Gold et al. (2023) there has been much less consideration of student teachers'

perceptions of self-efficacy and arising emotions whilst engaging with the academic element of learning to teach. This study makes an added contribution to research on the theory-practice divide in this regard. Teacher educators should, however, not only attend to issues of complexity and self-efficacy, but also be mindful of how emotions are bound up with meaning-making and conceptual change (Zembylas, 2005), especially if students experience dissonance between ideas in research and existing views about teaching and learning. If one of the aims of research-informed ITE is to engender an openness to alternative perspectives that may not resonate with existing beliefs and develop conceptual change, teacher educators need also to support student teachers empathetically with these experiences of dissonance (Jaber et al., 2018).

Finally, it is important to recognise how school colleagues influenced both Paul's and Ruth's views about the value of research in positive way, albeit relating to a particular type of research. This resonates with Joram et al.'s (2020) findings, which illustrated how school colleagues who provided examples of applicability appealed to students who preferred knowledge certainty. On the other hand, Tina's concern that her mentor would discount practices recommended by alternative perspectives reduced the extrinsic value of research. The influence of significant others in the school context reinforces Darling-Hammond's (2017) advocacy for the need for strong university-school partnerships, where both university tutors and mentors work together to guide student teachers to adapt theoretical knowledge into practice or promote cyclical knowledge flows of theoretical and practical knowledge (Tang et al., 2019). Although not without challenges, due competing priorities and pressures in schools, this joined-up team approach to teacher education could contribute to developing mentors' and student teachers' appreciation of the value of research.

Conclusion

In conclusion, this study has extended both the fields on the theory-practice divide in ITE and research in educational psychology, illustrating how social-psychological factors influence student teachers' views of research and its role in professional learning. The study's findings lend added weight to recommendations by other ITE researchers for the need for assistance with discipline boundary crossing, the importance of inquiry learning, and the enhancement of university-school partnerships. In terms of more novel implications for ITE, the study firstly highlights the importance of considering student teachers' prior experiences on EBs and EEs and the need for teacher educators to be pedagogically mindful of these regarding conceptual learning. Secondly, it signals how certain experiences whilst learning to teach can affect EEs regarding research, highlighting the need for pedagogical and curricular attention to their antecedents of novelty, value, control and significant others.

Note

1. The PGCE (post-graduate certificate in education) is a one-year course following an undergraduate degree in a subject domain or in a specialised age phase for primary school teaching.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This study was supported with research assistance from Rich Hatton and Kate Williams via university quality-related (QR) funding.

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