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Engaging Student Teachers with Evidence: Trainers' Perspectives of Barriers and Opportunities

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Abstract: *The next generation of teachers will be responsible for progressing evidence-based thinking in schools, engaging with research evidence to support their practice, and promoting critical thinking among students. In this context, it is useful to find out more about student teachers' engagement with evidence during their training. This interview study aimed to investigate barriers to student teachers' engagement with evidence, and ways to overcome these barriers, from the perspective of the teacher trainers who work with them. Our findings suggested that trainees are more motivated to engage with research if they see it as a norm and expectation of the job and if engagement is structured in ways that meet their needs for autonomy, competence, and relatedness (Ryan & Deci, 2017), and also pointed to a role for encouragement via simple nudges. We discuss how promoting research engagement can contribute to education's current and future challenges, and suggest evidence-based pedagogy as a valuable route forward.*

Keywords: *education, disinformation, practitioner, research engagement, evidence-based practice, motivation*

1. Introduction

1.1 Education and misinformation

In education today, and in society more generally, people's well-being is threatened by misinformation. Education has potential as a means to address this threat by developing certain characteristics among learners. Specifically, learners' capacity to evaluate information critically and their susceptibility to flawed ideas are connected to overconfidence (Pennycook et al., in press), low knowledge of science (Beauvais, 2022), and ontological confusion (Čavojová et al., 2019), all of which relate to the cognitive skills that education systems aim to develop.

This suggests an important role for teachers in terms of their willingness to engage with evidence in their teaching and to promote critical thinking among the young people in their care. However, student teachers may lack the confidence to take such an approach. Some may, for

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example, feel unprepared to deal with scientific topics in the classroom (Murphy et al., 2007; Sharp et al., 2009) as they enter practice. A key goal of the present study is to gain a better understanding of how student teachers currently engage with evidence, the factors that can motivate them to do so, and the barriers that may exist.

1.2 Evidence and pedagogy

There are two main areas where student teachers may need to engage with evidence. One concerns their knowledge of curricular content, and particularly in fast-moving "STEM" or current news areas, there is a challenge to remain updated (Watts, 2022). Misinformation is often associated with scientific issues (climate change; vaccination) or ones that affect the functioning of democratic states (fake news about political candidates, etc), and in the former case, keeping abreast of scientific developments may be challenging (e.g. Goldacre, 2012), especially for non-specialist teachers (Wola et al., 2023). However, in engaging with new research, practitioners (including student teachers) may model curiosity and critical thinking skills for their students.

Another domain of engagement with evidence which is relevant to teachers concerns their pedagogical practices. There is a range of evidence-based pedagogical strategies associated with more effective teaching outcomes across all disciplines, but it can be challenging to encourage teachers to adopt these instead of more intuitive or traditional practices (Bjork & Bjork, 2023). Some of the most powerful pedagogies run counter to intuition, and are not obvious from the short-term performance of pupils (Soderstrom & Bjork, 2015). Perhaps as a result, teachers appear to be underusing these strategies and failing to pick them up spontaneously through experience (Firth, 2021; Halamish, 2018).

Content and pedagogy are not completely separate domains, of course, but connect in three main ways. One connection is via pedagogical content knowledge – the capacity of skilled teachers to deliver the content in a pedagogically appropriate way (Shulman, 1986), for example via skilled explanations. Secondly, by using pedagogical strategies such as checking for understanding (Wiliam, 2011), distributing practice over time (Carpenter et al., 2012), and active learning techniques (Bransford et al., 2000), teachers can help students to better remember and understand relevant factual knowledge that is relevant to false claims, as well as developing critical thinking skills. A third link is that pedagogy is itself founded on research evidence, and this body of research is one that most teachers are exposed to in their training; most will have some familiarity with it by the time they enter the profession.

As well as improving student knowledge, pedagogical strategies can be applied more directly to the critical thinking needed for resisting misinformation. A specific example came from the work of Foot-Seymour et al. (2019), who used distributed practice (widely-spaced practice

sessions rather than intensive training) to promote criticality among elementary school pupils. Pupils were given guidance on detecting unreliable websites either in sessions that were close together (one per day, for three days) or relatively spaced out (one per week, for three weeks). At a later criterial test a month later, the school students who experienced spaced practice were better able to evaluate an unfamiliar website.

Overall, research engagement for the teacher has multiple benefits; it stands to benefit their content knowledge and/or their pedagogical skill directly, and through the combination of these things, may lead to more effective teaching of misinformation-relevant skills and knowledge, thereby better preparing students to be more critical consumers of information. This is before considering the potential of teachers to model a positive attitude towards engagement with evidence for the young people they work with.

The question then arises of how we can motivate teachers to engage with evidence in such a way that they come to display a capacity to remain up to date with scientific knowledge, utilise evidence-based practice, display pedagogical content knowledge, and model academic curiosity for the young people in their care. This question raises the issue of professional motivation, which we will consider next.

1.3 Teacher motivation

According to self-determination theory (Ryan & Deci, 2017), people are motivated by a need to feel competent, and this raises the question of whether student teachers consider themselves to be scientifically literate and have a positive self-concept when it comes to their research competence. This factor overlaps strongly with the widely-studied concept of professional self-efficacy. For example, one study found student teachers less willing to teach science if their self-efficacy as a teacher and learner of science was lower (Naidoo & Naidoo, 2023). Motivation affects the time that people will put into a task (Bransford et al., 2000), and teachers who feel less competent may therefore avoid research engagement.

Relatedness is another key need highlighted by Ryan and Deci's (2017) self-determination theory, and this again fits in with research into teachers' professional learning. Engagement with evidence can be collaborative, with some researchers praising "community of enquiry" approaches (Christie & Menter, 2009). Peers who engage with evidence could share skills and insights, though Leat, Lofthouse, and Reid (2014) caution that tensions can occur where some teachers are perceived as being more active in research than others.

Autonomy is the third need motivating behaviour according to the self-determination framework, and there is ample evidence connecting this to teacher professionalism. Sachs (2016) warned of the need for teacher autonomy rather than excessive managerialism, and the latter is a major factor associated with new teachers leaving the profession (Skinner

et al., 2021). It is worth considering social identity as a possible mediating factor; if student teachers have autonomy, how do they choose to use it? This could depend on whether they self-categorise as research-engaged professionals, as self-categorisation can influence behaviour (Levine et al., 2005; Monereo & Badia, 2020; Turner et al., 1987).

Behaviours in the workplace occur within a broader "choice architecture" – factors that nudge people to choose one alternative rather than another, often via relatively automatic cognitive processes (Thaler & Sunstein, 2008). Such nudges include default options (opt-out rather than opt-in), simplification of tasks, perceived social norms, pre-commitment to actions, and reminders (Sunstein, 2014). Although primarily investigated in the context of health and economic behaviours, such nudges can also potentially be applied to educators' motivation (Salehjee & Watts, 2020; Salehjee & Cunningham, 2021) alongside more overt factors.

In light of the above points, we predict that needs associated with self-determination theory (competence, relatedness, and autonomy) stand to mediate student teachers' engagement with evidence, possibly mediated by their self-categorisation as research-engaged professionals, and by simpler nudges.

To understand these processes better, we felt that it was important to ask trainers who guide student teachers for their views on their students' engagement with evidence in practice, and about the nature of any barriers to this. Trainers are fewer in number than student teachers but can take a broader perspective, having worked with dozens or even hundreds of students, at different stages, and over a period of time.

In addition, trainers' greater research expertise may put them in a better position to judge students' engagement with evidence than the students are in themselves. After all, it has been widely noted that those with less competence are poor at judging their own competence (e.g. Ehrlinger et al., 2008).

1.4 Research Questions

The main research questions of the current study are as follows:

- In the view of trainers, what motivates student teachers' engagement with evidence?
- In the view of trainers, what barriers to student teachers' engagement with evidence exist?

2. Methodology

2.1 Sampling and Data Gathering

We interviewed five trainers working in Higher Education institutions in Scotland, all of whom supported student teachers as part of their role. In Scotland, such courses (which include practice in a host school) are the primary route to attaining qualified teacher status; there are no private or fully school-led teacher preparation programmes. As noted above, the

Table 1 Participant Characteristics

Participant (Pseudonym) and years of experience	Focus within Education Academia	Research Expertise
Blake (3)	Education Studies	Hermeneutic
Charlie (3)	Education Studies	Qualitative
Dylan (5)	Teacher Education	Qualitative
Leslie (7)	Teacher Education	Quantitative
River (7)	Education Studies	Qualitative

rationale for approaching trainers rather than the student teachers themselves was that trainers have a broader perspective than the students themselves, and may have particular insights that arise from their research expertise.

The characteristics of the trainers recruited are shown in Table 1, including their specialist area of research methodology. Their years of experience as an education academic are shown, though it should be noted that some participants had experience in both research and teaching prior to entering academia.

Semi-structured interviews were employed; the interview instrument used can be seen in Appendix 1. This method was chosen as it allowed clarifications to be made immediately where necessary, facilitated follow-up questions from the interviewer, and encouraged a flowing, conversational approach to the interview, in which participants could freely express opinions, views, and attitudes (Gray, 2004). The interviewees were invited to take part via personal contacts based on our knowledge of the courses they were involved with in their role as teacher trainers (i.e. we used purposive sampling). The sample included professionals who worked across different routes into teaching, including undergraduate and postgraduate courses, and who supported teachers working with school pupils from the early years through to the secondary stage. This latter decision was based on a desire for insight into commonalities across student teachers in different school sectors; in addition, most of the trainers worked on more than one course, making it impossible to divide them according to sector.

The interviews were carried out by the research team in the participants' offices or in private meeting rooms in their places of work. They were audio-recorded and transcribed. The names of the participants were replaced with pseudonyms.

2.2 Approach to data analysis

Our analysis of the interview data was guided by Braun and Clarke's reflexive thematic approach (Braun & Clarke, 2022). This is a flexible approach that is not tied to a particular epistemological theory. It can be applied via a more inductive or deductive approach to analysis (or a combination), and in our case, we took

a deductive approach, aiming to interrogate the data for evidence of motivational factors and barriers as outlined in the introduction.

Reflexive thematic approach sets out several phases, including familiarisation, coding, generation of themes, and connecting themes back to the data. As the researchers had divided the interviews between them, both read the material several times during the familiarisation phase, focusing on written transcriptions, though audio was also available.

The transcripts were then analysed to find descriptive codes that best captured all meaningful and relevant responses. As recommended by Braun and Clarke (2022), we sought to ensure that the codes captured the meaning of participant responses efficiently while also being complete enough to stand alone. These codes were then refined to reduce duplication, with some codes being renamed. Overall, this process yielded 180 pieces of data. Each was then labelled with a code (a brief synopsis of the main idea expressed). A few of these were duplicates; there were 166 unique codes in total.

At this point, the codes were further reviewed by the researchers to establish whether any would be suitable candidates for themes (Braun & Clarke, 2022; Byrne, 2021). An interim "sub-theme" stage was used, with 30 sub-themes identified among the data, each one comprising several related codes (see Appendix 2). For example, the subtheme "Training – importance of developing research skills in students" linked to various codes such as "Trainees would benefit from skills training" and "Training focuses on applying research evidence to practice".

From this point, Researcher 1 identified initial main (superordinate) themes, which were then refined through discussion with Researcher 2, leading to five main themes being identified: *Identity and Affect; Cognitive Factors; Structures and Routine; Social Factors; Format of Evidence.*

After further review of the data and consideration of the validity of these themes in the light of the research ques-

Table 2 Summary of Main Themes

Theme (short name)	**Theme (full name)**	**Number of codes**
Affect and Identity	Affective – need to gain buy-in via clarity of purpose, identity, and a sense of the teacher's role.	24
Skills and Knowledge	Skills and knowledge – the role of beliefs, understanding, research skills, and other cognition.	72
Social Factors	Social – the role of norms, expectations, culture, leadership, and role models in engagement.	42
Accessing Evidence	Ease of accessing research and the way it is presented.	43

tions, it was recognised that the points listed under the *Structures and Routine* theme overlapped considerably with other main themes (particularly *Social Factors* and *Format of Evidence*). This was therefore collapsed into other themes, leaving a total of four main themes, with the fourth being renamed "Accessing Evidence" in order better to capture ideas relating to both the format of evidence and barriers to accessing it.

These main themes can be seen in Table 2.

We will now present our analysis of the data that linked to each of the main themes identified, focusing on how each one contributed to addressing the research questions.

3. Findings

3.1 Affect and Identity

Evidence within this main theme related to how new teachers see themselves, and their emotional engagement with evidence. The participants discussed the value of gaining psychological buy-in to the importance of research evidence among their trainee teachers. They also discussed the importance of clarity of purpose, identity, and autonomous decision making.

There were mixed views among the participants on the extent to which trainees have the confidence to engage with evidence. More than one participant expressed the view that trainees often did not have a clear sense of their own scientific literacy, and suggested that this could relate to confidence and their background prior to their training/studies. These two issues were seen as significant barriers, but it was also noted that students could at times underestimate themselves:

"I doubt very much that they would describe themselves as being scientifically literate. A lot of the time the students we work with have kind of an inferiority complex." (River).

"I don't think that many of them would see themselves [as research literate] but I think they probably are." (Charlie).

Likewise, it was perceived that students may not classify their own activities as engagement with research, even when they fall within that sphere:

"I think probably a lot of teachers are engaging with research, but they just don't see it as that... you know they are looking at Twitter, they're [attending] events and hearing about research..." (Charlie).

The participants also commented on the importance of intrinsic interest in research and evidence. A sense of its general value was seen as a factor motivating engagement, and three main causes of this were raised: potential career benefits, the impact on students, and (most frequently) student teachers' views on whether research engagement was part of their role. It was expressed that this latter point could be a matter of perception (see also main theme 2):

"Definitely professional development would be part of their job and continued learning. They really tend to value that. I don't know if they would frame it as research engagement necessarily." (River).

Student teachers were seen as having more buy-in to research evidence if it supported practice. Research which connected to pedagogy or to social justice was seen as more appealing, while highly theoretical research that appeared hard to connect to practice was seen as less so.

One participant noted that emphasising connections between research and practice at the training stage could help practitioners to understand and conceptualise research better. This appeared to be linked to confidence, showing the interconnection between knowledge of research and such matters as enjoyment of teaching or understanding of their role.

"Their teaching or their confidence or their general enjoyment of their job might benefit from engaging with research but it depends what they do with it." (Charlie).

Overall, in relation to this theme, it was expressed that students' engagement with evidence was strongly linked to their conceptualisation of research and their sense of its connection with their role. Here, the findings support the idea that identity will play a role, and also connect to the factors of the (self-determination theory) needs of relatedness and competence. Nudges which could connect to the points raised might include managers/mentors sharing examples of research-informed practice or highlighting that activities such as social media engagement and reading count as part of research engagement.

The main barriers raised concerned students' confidence and failing to see themselves as research-literate. This links to the second main theme – knowledge and skills.

3.2 Knowledge and Skills

This theme related to the participants' views of student teachers' research skills, as well as their perceptions of the need for further training and support. This overlaps to a degree with the previous theme (especially around affect/confidence), as mentioned above.

Perhaps unsurprisingly, the interviewees paid considerable attention to their student teachers' knowledge and skills. This main code accounted for the largest number of items coded (72 data points) out of the four main themes. The broader relevance of student teachers' ability to judge the quality of evidence was clearly stated:

"A scientifically literate citizen should be able to switch on their bullshit detector." (Leslie).

As noted earlier, the participants commented on student teachers' prior learning and assumptions. These were seen as having either a positive or negative effect on their understanding of research. Students brought misconceptions with them that the participants tried to correct. In contrast with the previous theme, the participants were at times outspoken regarding their students' limitations in this area:

"I start asking them to engage with some of the research… but I have to say with all honesty they are utterly garbage at it. They cannot do it... it's completely beyond their understanding from their undergraduate and often postgraduate experience; a lot of

it is down to the fact that, based on their prior experience of undergraduate study, they have only been exposed to one type of research." (Leslie).

It was apparent that all the participants placed at least some emphasis on equipping their trainees with capacities such as being able to critically evaluate research or question their own assumptions. Some also commented on the qualities and sources of research evidence and the need to guide trainees towards better options (see also main theme 4). Developing a recognition of the limitations of evidence was generally seen as crucial:

"I ask them to critique… I use a form of intellectual scepticism that I apply across the board" (Leslie).

A skill deficit within the profession (beyond the training phase) was perceived as a general challenge, and connected to this, many participants commented on the importance of ongoing professional learning including further study to improve research skills. Motivation to improve their skills or awareness was seen as variable, with participants commenting that some student teachers didn't see evidence as a priority in comparison to day-to-day classroom duties:

"The weight that an individual student puts on how useful research is to them is as wide-ranging as the students." (Dylan).

"There are [some] who see there is a link between what goes on in research and what goes on in the classroom, and it's as basic as that." (Dylan).

"You have to prioritise getting your lessons planned." (Blake).

Overall, it can be seen that participants perceived real limitations in scientific understanding, knowledge, and skills. In addition, a major barrier that was raised related to student teachers' perceptions and their tendency to prioritise immediate concerns over research engagement. There was concern that some did not understand the relevance of evidence at all. The main theoretical link of this theme is with students' competence (another self-determination theory need); nudges in this context could include increased ease of accessing professional learning, or simplified/gamified strategies for improving professional skills.

3.3 Social Factors

The next theme concerned the social influences on student teachers. This included managerial expectations, norms, workplace culture, and peers.

Barriers and constraints on research engagement were discussed in terms of conflicts that can arise for student teachers between a drive for research engagement and the norms and expectations of managers. It was recognised that these could vary, with some schools being more likely than others to establish a norm of research engagement. Some participants raised concerns that student teachers may be directly discouraged by the management, ethos, or norms in their school:

"Basically, the student teacher has to fit in with the staff that they're working with in the department, and the ethos they're faced with." (Blake).

"[A student's] head teacher didn't value her doing [a doctorate], kept asking her why she was doing it. So then she started to question, why am I doing it?" (Charlie).

"It's kind of an expectation to my mind, but maybe not all schools are like that." (Dylan).

At the same time, it was recognised that an expectation to engage with research could limit true engagement, connecting to the earlier main theme of identity and affect.

"It diminishes its return if it's compulsory. You also don't want it to be meaningless. You know, tick-box…" (Blake).

In contrast, a culture of research engagement was seen as highly valuable. More directly, it was felt that student teachers would benefit from a support network:

"It's got to do with the school culture and the management team within the school. So, raising awareness amongst the school leadership around the importance of research." (Charlie).

"[It would help] if there was some kind of research activity in the school or in the authority they were in... if there were a way in which they could fit into an already-established and thriving research community." (Blake).

It was observed that institutions' commitment to evidence is often uncertain, with some placing an implicit emphasis on maintaining the status quo rather than on critical engagement with new evidence. It was also noted that these institutional norms may conflict with training, where it has become the norm to promote the skills to engage with and critique research, which one participant expressed in terms of "facilitation":

"...I don't think permission's the right word, but facilitation. You can be critical or you can think about how this was done, where was it done, why was it done, what are the limitations. You know, asking them to think about those things." (River).

"The student teachers have to engage with research throughout their modules from first year to fourth year." (Charlie).

Overall, in relation to this theme, it can be seen that the participants perceived a strong influence of social factors on the student teachers, particularly within host schools. A supportive management, culture, or peers or a broader social network could motivate research engagement, while the lack of these things or direct opposition were viewed as major barriers.

Social factors relate to the (self-determination theory) need for relatedness. Social factors may also nudge research engagement where the setting features research engagement as a social norm; this may already be happening in more evidence-focused school cultures. Personalised communications such as signed invitations are also seen as a form of nudge, and this could take the form of peers or managers directly inviting student teachers to engage in research activities.

3.4 Accessing Evidence

The final main theme that was identified was the format in which evidence is available to trainee teachers and their ac-

cess to it. Several participants raised the issue of students' contact time or workload and the challenges of finding time to engage with research during the working day. This was seen as a key factor with a negative effect on engagement with evidence:

"For us to keep up with the research is hard, and it's our job to do it. Let alone somebody who is trying to plan lessons." (River).

"[Engagement with evidence] for a working teacher as part of a weekly routine, I think that is 'pie in the sky'." (Dylan).

The cost of access to research articles or books was also mentioned:

"The journal articles are behind a paywall and textbooks are really expensive." (River)

"Free access to journal articles, which will never happen, but yeah – access... is important because otherwise how do you expect them to read research?" (Charlie).

Concerns about the complexity of the sources themselves were also closely connected:

"The problem is, and this is a real issue, a lot of teachers don't have the time to sit down and read some of these quite verbose, quite in-depth, wordy [papers]" (Leslie)

However, some participants were cautiously optimistic that student teachers would engage outside work hours as long as research engagement activities fit around their other commitments and were in an accessible format. There was positivity about the prospect of student teachers engaging with evidence in varied ways, outside of the reading of traditional journal articles, including via conferences or simplified digests:

"[names] run a conference every two years for practitioners on a Saturday and it sells out. People will come. So, people will go to things but it has to be done in a way that works for their schedule" (River).

"Students would be expected to engage with research in various formats from internet-based things to journals and textbooks and all of that kind of thing" (Blake).

"I did some work in a local authority a few years ago and they had a subscription to this thing that was like a research digest" (River).

Overall, these points suggest that time was seen as a major barrier to engagement, and that costs can be prohibitive. Regular research engagement was seen as especially demanding. More infrequent engagement via conferences and simplified sources were seen as more realistic.

Ease of access links strongly to nudge techniques; making things more easily available nudges people towards certain actions, in this case research engagement, as do routines and reminders. Complexity and other barriers will nudge them away from those actions. Managers could help by allocating research time within teachers' schedules, and this may also impact on perceived identity (theme 1).

4. Discussion

4.1 Review of Findings

Teachers act as role models for young people, and are in a position to promote

engagement with evidence in the classroom, support students' critical thinking, and tackle misinformation. This can happen both via their engagement with scientific evidence directly, and by using effective pedagogies based on evidence-based practice. The present results raise some concerns in terms of the preparation of new teachers for this role, but also point towards practices which can support new teachers to engage with evidence more fully.

The immediate barriers to the research that were raised by our interviewees focused on its cost and accessibility. It was perceived that student teachers did not easily find the time to engage with research as part of their day-to-day duties, with engagement outside this time also being challenging. This fits with prior evidence (e.g. Lowden et al., 2019) which has concluded that time is a major barrier to teachers' evidence engagement. The research sources themselves were seen as overly complex, and at times inaccessible.

Accessibility of research links to knowledge and skills, and, in particular, student teachers' competence. The participants questioned this, with even graduates seen as lacking the skills to engage with and critique findings. This is important because experts think differently from novices (Bransford et al., 2000), and novices engage with evidence in a way that is more effortful and more prone to misunderstandings (Nelms & Segura-Totten, 2019). Teachers therefore need a level of expertise to engage with evidence effectively.

Connected to this, Korthagen (2010) argued for tackling the theory-knowledge gap via a "realistic" approach, focused on real classroom problems. Our findings support the view of the theory-knowledge gap as a problem. The accessibility and applicability of evidence would be improved if it could be directly linked to classroom problems, rather than standing alone; the participants noted that highly theoretical research was less well received, and that practical links would make concepts easier for trainees to understand.

Following on from these points, ongoing training needs were discussed, and while the participants viewed motivation to engage with research or develop relevant skills as variable, engagement with ongoing professional learning was identified as an area where student teachers tend to be highly motivated. This may link to its perceived practical relevance. However, some participants had concerns about schools' support for student teachers' research aspirations. It was suggested that students would have to fit in. Ryan and Deci (2020, p. 1) talk of teachers being "impacted and constrained by controlling mandates, institutional pressures, and leadership styles". Here, management and peers as barriers were among the social factors discussed by our participants, though social structures could also motivate student teachers to persist.

The overall pattern of motivation to engage with research is in agreement with the predictions of self-determination theory. Individuals are motivated when their psychological needs are met via supportive

contexts (Ryan & Deci, 2017; 2020). Our findings suggest that the three key needs described by the theory can be met as follows:

Competence: student teachers' skill level can be improved via training so that engagement with evidence is easier and they feel more confident in their engagement;

Autonomy: being free to prioritise and follow one's own path in how and when to engage with evidence and having time to do so; avoiding overly managerial approaches;

Relatedness: engaging new teachers in a community of peers, and working in schools where engagement with evidence is part of the social norm.

These theoretical points and findings together suggest structures that may already be in place for some student teachers who enter the profession. For others, changes may be needed in order to align with motivational principles.

Can student teachers' motivation (or lack of motivation) be influenced by nudges? These could be enacted more quickly than the structural changes suggested above. Of course, the participants tended not to talk about nudges directly, but nevertheless, there was promising evidence. The simplification of tasks is a major type of nudge (Sunstein, 2014), and this was raised via comments on simplified research summaries and regular email bulletins. Other possible nudges which appear relevant on the basis of our data could include routine research time within teachers' schedules, reminders, making social norms more overt, simplifying skills training, or personalised communications about research. Such nudges all aim to motivate good choices by making these easier to make, more attractive, or more memorable (Lin et al., 2017; Sunstein, 2014; Thaler & Sunstein, 2008).

Changing defaults to opt-out rather than opt-in is another nudge that has been widely discussed, and in this context, student teachers could potentially be automatically enrolled in research training or conferences, leading to additional effort to exclude themselves while keeping this option possible if they choose to do so. However, there are ethical concerns about changing defaults (van Gestel et al., 2021; Mols et al., 2015). To investigate this and other nudges more fully, it would be helpful to attempt an intervention; the present findings are, at least, suggestive that such interventions would be worth exploring.

Motivational strategies of any kind are less likely to be effective if an activity falls outside a person's identity and they do not see value in doing it. As Monereo and Badia (2020) argue, deep and permanent educational changes require a change in identity. Similarly, Mols et al. (2015) suggest that a change in behaviour is less likely to last if it conflicts with a person's social identity, and more likely to last when it connects to an identity change and is supported by social norms.

In our data, the most prominent identity-related finding was that engagement with evidence is not typically seen as part of a teacher's role. A common view was that teachers only engaged with evidence

insofar as it was seen as directly relevant to the classroom, and that only some perceived broader connections. This may indeed be a norm throughout the profession, acting as a disincentive to engage within the choice architecture that student teachers encounter.

4.2 Conclusions and Future Directions

The above discussion points highlight certain barriers to teachers' engagement with evidence, and subsequently with their capacity to engage and tackle misinformation in the classroom. One possible way forward may lie in the connections between research and pedagogy. The participants expressed the view that evidence directly connected to classroom practice was seen much more positively by their students, suggesting that pedagogy-focused evidence could provide a useful medium for developing research skills.

Given that evidence-based practice leads to better outcomes (e.g. Bjork & Bjork, 2023), this type of evidence may be seen by school managers as a higher priority than other forms of research engagement, and it is relevant to all subject disciplines. It may also be easier for trainers or mentors to explain in a way that links to practice, thereby helping to narrow the theory-practice gap as suggested by Korthagen (2010).

If engagement with pedagogy-focused evidence led to teachers becoming more effective in their classrooms, there could be a knock-on benefit in terms of supporting critical thinking and tackling misinformation. Evidence-based pedagogic strategies could help to ensure that knowledge and skills are better learned, preparing pupils to resist misinformation.

However, even in the area of pedagogy, a reframing of the teacher's role and the approach of schools may be necessary. Our findings suggest that teachers are more motivated to engage with research if they see it as a norm of the job, and if it is structured in ways that meet their needs for autonomy, competence, and relatedness (Ryan & Deci, 2017). This may be prompted and supported by nudge strategies.

We recognise that the present data represent a small sample and may be biased by the particular context (the Scottish education system). All the same, the straightforward links that can be drawn between the findings and theories of motivation suggest that these issues may be common to a number of settings, and where this is the case, similar strategies and approaches may be helpful. Our participants' reflections on the struggles that student teachers have with research engagement, and sometimes a lack of awareness of these struggles (e.g. "*... it's completely beyond their understanding*" – Leslie), help to justify gathering data from trainers as part of understanding these processes.

Future research could use questionnaires to survey a wider sample. Pilot trials of motivational strategies to support student teachers as they enter practice would also be instructive, in order to

gain a better understanding of how much impact (if any) these can have. Follow-up studies could also interview student teachers themselves, ideally longitudinally, to get a clearer sense of how their identity and research priorities shift through the early phases of their careers.

Overall, this small-scale study of teacher trainers has indicated the need to focus on teachers as professionals who can both use and critique evidence. There are several barriers to this for student teachers, not least their confidence, their skills, the social context, and the time they have to engage with evidence. Their identity and sense of a teacher's role are also seen as important. Focusing on engagement with evidence-based pedagogy is suggested as a promising avenue for increasing overall engagement with evidence.

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FIRTH, K., SALEHJEE, S. Zapojení studentů učitelství do práce s důkazy: Pohled školitelů na překážky a příležitosti

Příští generace učitelů bude zodpovědná za rozvoj myšlení založeného na důkazech, za zapojení výzkumných důkazů do své praxe a za podporu kritického myšlení u studentů ve školách. V této souvislosti je užitečné zjistit více informací o tom, jak se studenti učitelství během své přípravy zabývají důkazy. Cílem této výzkumné studie bylo zjistit překážky, které studentům učitelství brání v zapojení do práce s důkazy, a způsoby, jak tyto překážky překonat, a to z pohledu vzdělavatelů učitelů, kteří s nimi pracují. Naše zjištění naznačují, že studenti jsou více motivováni k zapojení do výzkumu, pokud jej vnímají jako normu, tj. že se to v jejich práci očekává, a pokud je zapojení strukturováno způsobem, který uspokojuje jejich potřeby autonomie, kompetence a vztahovosti (Ryan & Deci, 2017). Také poukazují na roli povzbuzení prostřednictvím jednoduchých pobídek. Diskutujeme o tom, jak může podpora zapojení do výzkumu přispět k řešení současných i budoucích výzev ve vzdělávání, a navrhujeme pedagogiku založenou na důkazech jako cennou cestu vpřed.

Klíčová slova: *vzdělávání, dezinformace, odborník z praxe, zapojení do výzkumu, praxe založená na důkazech, motivace*