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BRIEFING NOTE:
SUBJECT PEDAGOGY AND THE MENTOR (2023-24)

Welcome to this briefing note on the topic of subject pedagogy and the mentor.

In most cases, your mentee has a relatively short period of time to learn how to be a subject specialist teacher; in the space of one to two years, they need to progress from observing the teaching of others to planning and delivering their own lessons. The trainee's relationship with the subject-specialist mentor is at the heart of the placement experience and - as the period of traineeship gets more demanding - the support provided by the mentor becomes even more crucial. Indeed, relatively recent research undertaken by Ofsted highlights the "critical" role that mentors have in supporting the "practical implementation" of the Initial Teacher Education (ITE) curriculum (Ofsted, 2020, no page).

One of the key roles of a subject-specialist mentor - summarised in the ITT Mentor Standards (2016) - is to:

Support the trainee in accessing expert subject and pedagogical knowledge (Standard 2.6).

In order to develop trainees' subject-specialist and curricular knowledge and provide subject specific pedagogical training, the mentor must keep their own subject-specialist knowledge up to date.

This is highlighted in the standard below which states that mentors should:

Continue to develop their own mentoring practice and subject and pedagogical expertise by accessing appropriate professional development and engaging with robust research (Standard 4.6).

Subject knowledge and subject pedagogy

To start with, it is important to distinguish between subject knowledge and subject pedagogy. Subject knowledge relates to the teacher's knowledge of the curriculum, or subject matter; it is a key indicator of teacher expertise across the age phases, including the FE/TVET sector (Bernstein, 2000; Anderson & Taner, 2023).

Subject-specific pedagogical knowledge relates to the pedagogies that teachers use to teach their subject, or how aspects of a subject "become known" (Shulman, 2005, p.54); it is usually abbreviated to SPK.

Subject pedagogy is not a secondary concern in the ITE curriculum; rather, developing subject pedagogy is central to the development and practice of expert subject specialist teachers. It is of particular importance when mentoring trainees who are following a generic programme of teacher preparation (Thompson, 2014).

Signature pedagogies

As part of the ITE (LLL) curriculum at the University of Huddersfield, trainees undertake two practice modules: Being a Subject Specialist Teacher and Becoming a Subject Specialist Teacher. The modules present a vital opportunity for mentees to develop their specialist pedagogical knowledge and understanding of signature pedagogies (Shulman, 2005).

Lee Shulman defines signature pedagogies as "the types of teaching" that are used to educate "members of a particular profession" (Shulman, 2005, p.52); in this case, subject specialist teachers. A signature pedagogy has three dimensions, or structures: surface, deep and implicit. The ways in which they do are summarised in Table 1:

Surface	• concrete, operational acts of teaching and learning
Deep	• a set of assumptions about how best to impart a certain body of learning
Implicit	• a moral dimension that comprises a set of beliefs about the professional attitudes, values and dispositions

Table 1 The three structures of signature pedagogy (see Shulman, 2005, pp.54-55).

The practice modules address all three levels of Shulman's model. The ways in which they do so are summarised below:

- **Surface:** the modules contribute to the development of progressively more advanced strategies and methods for promoting subject specialist learning.
- **Deep:** trainees explore the characteristics of pedagogical techniques used in the subject area and reflect critically upon their application in the classroom.
- **Implicit:** trainees are engaged in the "moral dimension" of their field through professional enculturation.

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Subject-specialist mentors can address the three levels in their interactions with mentees by:

- *Facilitating the mentee's socialisation into a specific subject-specialist team.* **To do this the mentor should be approachable, make time for the trainee, and prioritise meetings and discussions with them (1.1); use a range of effective interpersonal skills to respond to the needs of the trainee (1.2); and offer support with integrity, honesty and respect (1.3).**

- *Building the foundations of the mentee's specialist pedagogical expertise at an early stage. This involves helping the mentee to identify the signature pedagogies of their subject.* **To do this the mentor should support the improvement of a trainee's teaching by modelling exemplary practice in planning, teaching and assessment (1.5) and support the trainee in accessing expert subject and pedagogical knowledge (2.6).**

- *Supporting the implementation of the ITE curriculum by giving trainees access to a broad range of teaching experiences (comprising different levels, different students and different settings) in their subject area.* **To do this the mentor should broker opportunities to observe best practice. (2.5).**

- *Connecting the teaching material within the ITE curriculum with current subject-specialist examples from practice.* **To do this the mentor should support the trainee in accessing expert subject and pedagogical knowledge (2.6).**

- *Progressively deepening the mentee's engagement with specialist pedagogies, including signature assessment and feedback practices (Pitt & Quinlan, 2021).* **To do this the mentor should support the trainee in developing effective approaches to planning, teaching and assessment (2.1).**

- *Engaging the mentee in critical dialogue around the subject and its pedagogies, with a particular focus on examining the thinking that underpins "the choice of one pedagogy over another" (Parker, Patton & O'Sullivan, 2016, p.141).* **To do this the mentor should use appropriate challenge to encourage the trainee to reflect on their practice (1.4); enable and encourage the trainee to evaluate and improve their teaching (2.8); and enable the trainee to access, utilise and interpret robust educational research to inform their teaching (2.9).**

Each descriptor has been mapped to key descriptors within the ITT Mentor Standards (2016).

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This table presents a range of signature methods that characterise the disciplines.

Art and Design	• Studio-based activity • Showing work to peers and in the public domain (e.g. group peer critique, interim exhibitions and graduate show exhibitions)
Biomedical Sciences	• In silico methods • Problem Based Learning (PBL) • Laboratory work, including digital laboratory tools
Business and Management	• Business case teaching • Work-based learning, including placements and internships • Live or 'real world' projects
Media, Film and Cultural Studies	• Demonstrations • Screenings • Live projects • Production practice
Computing	• Live projects (design-and-build) • Problem Based Learning (PBL) • Hands-on learning opportunities (e.g. programming, networking) • Computing-related case studies • Exposure to high-quality software, tools and materials (e.g. graphics packages, computer-aided software, project management software).
Dance, Drama and Performance	• Performance/production projects • Independent practice • Studio practice/workshops (e.g. voice, movement, technique practice) • Work-based projects (e.g. community and socially engaged projects) • Critical Response Process (CRP)
Early Childhood Studies	• Engagement with practice • Personal reflection • Individualised and self-directed learning approaches
Engineering	• Design, Build and Test (DBT) • Project-Based Learning (PBL)
Events, Hospitality, Leisure, Sport and Tourism (EHLST)	• Industrial placement or work-related learning, including volunteering activities • Learning opportunities in specialised and event-specific facilities • Contact with industry, associations or professional bodies (e.g. through field work) • 'Live' case-studies and events/productions • Simulated environments
Health Studies	• Reflective and critical approaches • Learning communities • Simulation and immersive technologies

Table 2 Some signature methods

To stimulate thinking around subject-specialist teaching and learning, please see the work that the University of Huddersfield has undertaken on subject specialist pedagogy for the Gatsby Foundation. The link is as follows: **https://www.improvingtechnicaleducation.org.uk/teacher-education**

The resources on this website (presented as videos, animations and text) are designed to help inform subject-specialist pedagogy for science, engineering and technology teachers who work in Further Education (FE).

The website contains a particularly helpful section on Shulman's concept of Pedagogical Content Knowledge (PCK). This relates to how a teacher's subject knowledge informs their pedagogical decision making. The resources include examples of PCK in a range of contexts (animal science, engineering and computing).

For a comprehensive insight into subject-specialist teaching and learning, please see the video by Professor Kevin Orr titled *Subject knowledge and social justice: Putting pedagogy in its place* (2021) at the following link https://videohud.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=0aaa963b-73e5-40e9-84f0-adfd009b6625

You may also find a collection of five minute teaching videos produced by the Institute for Academic Development at the University of Edinburgh of interest. These can be found at https://open.ed.ac.uk/5-minute-teaching-videos/

Each video features a different member of teaching staff discussing the values that guide their pedagogical approach. The videos are narrated by higher education practitioners, but the ideas are transferable to any age phase. The videos serve as a helpful model to help you to articulate your own ideas about effective teaching and learning in your subject area.

Specialist observation feedback

Mentors observe their mentees at least twice during the ITE (LLL) programme; this is an integral part of the practice modules (**Becoming a Subject Specialist Teacher** and **Being a Subject Specialist Teacher**).

Observation feedback provides mentors with an opportunity to foreground the skills that are relevant to teaching in the mentee's specialist area, their subject-specialist knowledge and the development of subject resources.

Feedback should reference the way that the mentee is demonstrating specialist pedagogical knowledge and the mentee should be encouraged to critically reflect on and evaluate SPK practices across the three domains of signature pedagogy.

Table 3 includes a range of examples of how observation feedback can reflect the signature pedagogies of a specialist field. In these examples, feedback addresses all three dimensions of Shulman's model: surface, deep and implicit.

The examples are not meant to be prescriptive; rather, they demonstrate how signature pedagogies can be addressed in feedback.

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Subject (FE/VET Sector)	Observation comment that relates to the way that the student teacher is demonstrating signature pedagogies and signature assessment practices
Chemistry	• You referred to atomic structure as a threshold concept highlighting that all learners must have a secure knowledge of this area before progressing onto the next stage of the course. To learn more about threshold concepts (specifically in chemistry), see the article attached to this observation form. • Consider Problem Based Learning (PBL) – a well-established teaching method in the sciences - as an approach in future sessions. You can find a range of teaching resources at the website of the Royal Society of Chemistry.
Sociology	• Sociology (in common with other social sciences) relies heavily on the learner's ability to engage in analytical thought and problem-solving. The teaching methods that you used are based on the accepted methods for imparting sociological knowledge. You included a range of methods, including the implementation of collaborative learning situations: learners were encouraged to think like sociologists. • A range of complex ideas were shared with learners in an accessible way. You encouraged the group to relate their own personal theories to sanctioned theoretical knowledge. This skilful dialogue helped your learners to surmount some key threshold concepts. • You are aware of the moral dimensions of your role and are able to engage in open conversations with your learners on a range of complex perspectives and themes, including religion, gender and ethnicity; moreover, you are able to interpret their responses well. • There are some useful publications available that can help you to develop your knowledge of the teaching and learning process in the sociology classroom even further (e.g. Teaching Sociology).
Beauty - Eye Treatments and Waxing	• Evidence of highly authentic instruction – use of practical tasks facilitated transfer. This was an industrious classroom, simulating the Real Work Environment (RWE). Your objectives were derived from the knowledge and skills your learners will need in their employment context. You used learning contexts, tasks, materials, and procedures taken from the future situation in which the learners will be working. • Principles of good practice were modelled and explicitly drawn attention to throughout the session (e.g. the position of the spatula, the correct procedure to follow after eyelash tints etc). Professional discourse used (e.g. "clients"). By using processes such as the modelling approach, your students could readily identify relevant and appropriate behaviours during a range of treatments. A factor promoting intrinsic motivation – imagination – was addressed via role play (for example, client and therapist roles). • Health and Safety in the professional context was highlighted on numerous occasions, with principles of good practice highlighted throughout (e.g. removal of biohazardous waste; cleaning wax pot etc). • Collaborative social interaction was a vital component of your session – an approach which embodies situated learning and the social construction of knowledge. During the session, learners become involved in a 'community of practice', enacting and reflecting upon the acquisition of situation-specific behaviours. • Strong Assessment for Learning (AfL) techniques in evidence, with close scrutiny, observation and monitoring of your learners' practical skills. Correction given during the application phase was in accordance with the cognitive apprenticeship model.

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Subject (FE/VET Sector)	Observation comment that relates to the way that the student teacher is demonstrating signature pedagogies and signature assessment practices
Clinical Physiology - cardiology	• Evidenced in up-to-date knowledge, also (e.g. new guidelines; move from treadmill testing and use of a pharmacological agent instead). • This was a constructive rather than transmissive learning environment that was underpinned by references to clinical problem-solving. You avoided oversimplification and engaged in small problem-solving exercises, reflecting the complexity and multidimensionality of - and multiple possibilities within - a clinical setting. • Real-life interaction with patient used to demonstrate the procedure of applying the electrocardiogram (ECG).
Materials, Techniques and Processes in Art and Design	• The group consisted of art and design students. Of especial interest, therefore, was your strong focus on techniques and processes. Students were encouraged (in a very non-behaviourist manner) to: 1. *think and express themselves in original ways by extending the brief in unpredictable directions* ("Go mad with it. See what you can do"; "You can do random techniques like you did with your mark making"); 2. *take risks without knowing what the outcome would be* ("Try crayon. See how it works"; "Experiment with your crayons"; "Have fun. Play. This is your time to experiment"; "Try and use many different tools to see what marks they create") and explore (learners encouraged to produce three pieces); 3. *extend their technical abilities* ("Get used to the tools"; "From there, think about how you can use your tools to create textures"); 4. *exploit the characteristics of materials and processes inventively*; and 5. *communicate original ideas and insights, linking them to previous research* ("Do you remember what you've researched? Frottage?"; "Remember to think of textures. Think about your project"). • Could the learners have been encouraged to critically evaluate each other's work, involving them in a community of practice?
Health and Safety - Site Management Safety	• This was the first session with a new group, so a lot of time was spent eliciting participants' perceptions of their role and the industry itself. • Anchored instruction (see T. Sticht – Functional Context Theory) served to contextualise theory in a number of real-world issues. Sticht argued that student persistence could be improved if courses were directly linked to job training objectives. The functional context approach to learning stresses the importance of making learning relevant to the experience of learners and their work context, which is central to your approach. • Clear links to conditions of professional training, certification of professional competence and conditions of work and practice enhanced these links. • Content enhanced learning transfer and encouraged learner reflection on workplace competencies.

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Subject (FE/VET Sector)	Observation comment that relates to the way that the student teacher is demonstrating signature pedagogies and signature assessment practices
Medicine – radiotherapy planning	• This was a 1:1 teaching situation, which had an interesting problem-based focus from the beginning. Symbiosis between clinic and learning environment achieved. The RWE (Real Work Environment) does not shield the student from the phenomenological reality of practice and you created learning opportunities from problematic cases, translating them skilfully into competency-related tasks. Had you chosen these cases because they were particularly problematic? • A dialogic learning situation appropriate to case-based discussion evidenced throughout. Modality choices encouraged dialogue and collaborative inquiry ("Shall we just measure how much anterior-posterior it is?"). Thinking aloud strategy adopted when exploring prognosis (e.g. "My big worry at this point is the spinal cord"), demonstrating that diagnostic decisions are not reached easily. Your thought processes thus presented an interesting (and valuable) trajectory for your student. In turn, you encouraged your student to make her own thinking explicit ("So, do you want to prescribe?"; "Are you happy about the cord dose?"). Lave and Wenger state that talk is a vital part of professional preparation; novice professionals need to "learn to talk their way into expertise" (2003) and the above is an example of how you promoted this. • You modelled positive interaction well in your effective and courteous exchanges with other members of the team (e.g. nursing and support staff). Your interactions conveyed an appreciation of the important role such figures play in patient management and care and it is vital that such professional standards are displayed. • Discussion about the clinical cases you had chosen highlighted a number of non-medical issues (e.g. ethical issues and those to do with resource allocation). The empathy you bring to your role is so important. • Due to the problem-based nature of the session, you used heuristic-type questions, designed to help the trainee identify the ways in which she might develop her understanding or come up with the correct diagnosis in light of potential risk ("How can you manage to do the anterior obliques and the anterior neck? What else might you do? Lateral Thinking"; "If you felt that this was not covering adequately, how would you alter the radiation beams?"). • You had pre-selected some examples of "worst" clinical cases (including X-rays, images and the results of tests or investigations) which you used as stimulus material. This valuable empirical data had especial relevance since based on real patients. You had carefully chosen this data to illustrate specific learning points and stimulate discussion. Data was accompanied by extracts from subject-specific journals (e.g. The Lancet) and statistical reports showing trends and disease patterns.
EAL (English as an Additional Language)	• This session evidenced some of the many variables involved in ESOL pedagogy (e.g. knowledge of learner composition, goals and objectives, content specific issues). • You had planned role play as an instructional strategy. This is an appropriate methodology for promoting affective objectives and the development of interpersonal skills – a worthy ILO in the EAL classroom. The picture matching exercise promoted communication between randomly assigned pairs. • Strong AfL in evidence via monitoring, peer/self-correction. Concept attainment and understanding checked through a mixture of cognitive and affective Q&A techniques. • Use of iconic gesture reinforced vocabulary. Transition activity – with learners moving into another configuration – incorporated to stimulate communication between different members of the group. Learners were encouraged to communicate with one another; this is especially important in a language learning environment. • Use of images reinforced vocabulary and reduced cognitive load. • Secure use of meta-language associated with language learning. Session content linked to the two strands of communicative competence: pragmatic (functional, sociolinguistic, interactional and cultural) and linguistic (phonological, grammatical and lexical).

Mentor support and the 4-stage typology of teacher development

The FE ITE curriculum at the University of Huddersfield is based on a "clear and coherent rationale" (Ofsted, 2020, no page). Its design reflects the four stages of the teacher learning continuum described in Figure 1 below.

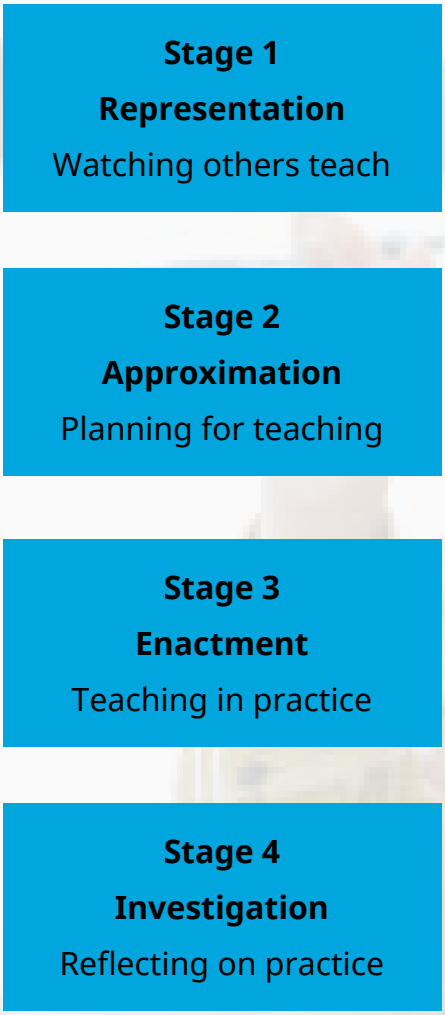

Fig.1 The process of becoming a teacher. Adapted from McDonald, M. et al., 2013, p.382.

These key stages inform the sequence of the curriculum and the teaching and learning strategies used throughout the programmes. In the first module titled Research Informed Teaching, Learning and Assessment, which is based heavily on practical preparation, representations of practice enable trainees to learn about the processes of teaching and learning. This first stage is particularly important in the formation of beginning teachers. Micro-teaching is a key component in this module. This gives trainees an opportunity to approximate practice through planning for and rehearsing lessons with their peers. At this stage, trainees are encouraged to critique representations of practice through observing their subject-specialist mentors also.

Modules 2 and 3 include the teaching practice element of the course. Trainees are required to complete a minimum of 100 hours teaching practice, 50 hours within each of these practical modules. The focus of the first practical module (Becoming a Subject Specialist Teacher) is on the development of the trainee's teaching skills and their ability to apply both general and specialist pedagogical principles to practice. In the second practical module (Being a Subject Specialist Teacher) trainees can

further develop the pedagogical application of subject knowledge and broaden their participation in the role of a professional within the sector. This is particularly important in the training of vocational teachers. In line with stage 2 of the teacher development continuum, opportunities to engage in collaborative planning (and teaching) with the subject-specialist mentor are crucial at this stage.

The mentor is critical to the third stage: the enactment of practice. Subject-specific mentoring is an integral part of the teaching, learning and assessment methodologies in the practical modules. As well as developing trainees' knowledge about teaching in general (pedagogical content knowledge), the mentor supports trainees to acquire experience in teaching their own specialism, including the development of subject-specialist teaching and learning resources.

Our ITE programmes promote critical reflection on experience and reflective writing is a key feature of all the modules. This is primarily through a series of 'Structured Reflections' in which trainees are expected to record moments of personal and professional development and investigate their practice.

The mentor plays a key role in this fourth stage and is expected to integrate methods for promoting the critical investigation of practice in their discussion with trainees.

The key stages outlined above inform the sequence of the curriculum and the teaching and learning strategies used throughout our ITE (LLL) programmes.

It is helpful to apply the stages of the 4-stage typology to aspects of mentor support. The table below provides a starting point, with particular reference to the two practice modules: Becoming a Subject Specialist Teacher and Being a Subject Specialist Teacher.

The ITT Mentor Standards are integrated into the four-stage representation of mentor support. Standards 1 and 3 and their sub-descriptors underpin all of the stages.

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Table 4 Mentor contributions linked to the 4-stage typology of teacher development.

Stage of TLC	Description	You can do this by:	Links to ITT Mentor Standards (2016)	Module
Representation	**The aim is to learn from the subject-specialist knowledge, skills and competencies of others.**	• Helping the mentee to understand the distinction between subject knowledge and subject pedagogy at an early stage. • Increasing opportunities for mentees to observe subject-specialist delivery in practice. • Encouraging the mentee to identify practices associated with SPK in specialist teaching sessions. • Sharing specialist resources with mentees and encouraging critique. • Building on centre-based ITE curriculum activities, linking generic theory to subject-specialist content and knowledge.	All elements of Standard 1. 2.5, 2.6, 2.9. All elements of Standard 3.	Becoming a Subject Specialist Teacher
Approximation	**The focus is on approximating expertise.**	• Introducing the mentee to the scope and variety of subject-specialist classroom practices (both virtual and in-person). • Modelling learning design that is informed by SPK principles. • Encouraging your mentee to practise using subject-specialist pedagogical approaches. • Helping your mentee to identify the areas of specialist practice that they need to work on. • Interweaving the specialist discourse of your subject into professional discussions with your mentee. • Maximizing the mentee's engagement with subject-specialist theory and pedagogical practice (including simulated). • Providing mentees with opportunities to practise what they have learned from their course modules.	All elements of Standard 1. 2.2, 2.4, 2.5, 2.9. All elements of Standard 3.	Becoming a Subject Specialist Teacher

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Stage of TLC	Description	You can do this by:	Links to ITT Mentor Standards (2016)	Module
Enactment	**The emphasis is on the enactment of subject specialist expertise in the classroom.**	• Linking SPK practices to authentic workplace experiences (largely applicable to VET classrooms). • Increasing your mentee's exposure to a range of specialist curricula. • Formatively assessing the enactment of subject specialist expertise in the classroom. • Communicating the progress of your mentee in subject specialist terms and applying measures of SPK to verbal and written feedback on your mentee's practice. • Identifying gaps in the mentee's SPK competencies and skills and providing opportunities to bridge these. • Integrating subject-specific literature and evidence-informed research into written and verbal feedback. • Providing details of subject specialist professional development that the mentee can undertake within the placement setting.	All elements of Standards 1, 2 and 3.	Being a Subject Specialist Teacher
Investigation	**The goal is to interrogate practice and use the outcomes of reflection (both mentor-led and self-initiated) to promote long-term specialist development.**	• Supporting the mentee's subject-specific reflections on practice. • Encouraging the mentee to evaluate the reliability of subject-specialist teaching methods. • Stimulating critical reflection on pedagogical values in observation feedback. • Using the signature pedagogies framework to structure reflective discussion with your mentee. • Signposting your mentee to professional development focused on SPK and specialist curriculum materials. • Highlighting opportunities to engage in practitioner-based research in the specialist field.	All elements of Standard 1. 2.6, 2.9. All elements of Standard 3. All elements of Standard 4.	Being a Subject Specialist Teacher

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Ultimately, mentors make a significant difference to the outcomes of trainees. The list of descriptors above indicate the many ways in which this can be achieved. However, teaching also involves “adaptive expertise” (Stigler & Miller, p.436) and it is anticipated that during the placement experience mentors will identify a range of other useful approaches that can support their mentee's progress along the way.

References and further reading

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Some subject-specific sources

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Journals

- Chemistry Education Research and Practice
- Educational Studies in Mathematics
- Research in Science and Technological Education

Subject associations

- Adults Learning Mathematics (ALM)
- Association for Science Education
- Association for the Teaching of Psychology (ATP)
- Association of Teachers of Mathematics
- Association for Language Learning (ALL)
- British Psychological Society
- British Society for Research into Learning Mathematics (BSRLM)
- CLEAPSS Science
- Design and Technology Association (DTA)
- English Association
- English & Media Centre (EMC)
- Institute of Physics
- Joint National Association for the Teaching of English (NATE)
- London Mathematical Society
- Mathematics in Education and Industry (MEI)
- National Association for Numeracy and Mathematics in Colleges (NANAMIC)
- National Association for Teaching English and Community Languages to Adults (NATECLA)
- National Drama (ND)
- National Society for Education in Art and Design (NSEAD)
- National Subject Association for English as an Additional Language (NALDIC)
- One Dance UK
- Personal, Social, Health and Economic Association (PSHE)
- Royal Academy of Engineering (RAEng)
- Royal Society of Biology
- Royal Society of Chemistry
- National STEM Learning Centre STEM Learning
- The Technology, Pedagogy and Education Association (TPEA)