Effective mentor training, education and development: a qualitative multi-level meta-synthesis

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Abstract

Purpose

This paper synthesises international research on effective mentor training, education and development (MTED).

Design/methodology/approach

An adaptive theory methodology (Layder, 1998), combining deductive and inductive methods, was deployed in a qualitative meta-synthesis of thematic findings generated in three studies: a systematic review of literature published between January 2010 and July 2020, together with a secondary analysis of studies including evidence on MTED; a subsequent systematic review of literature published between August 2020 and May 2023; and a general inductive analysis (Thomas, 2016) of interviews of leaders of large-scale MTED programmes which had good evidence of impact.

Findings

Our meta-synthesis found that effective MTED is evidence-based, refined through on-going research, tailored both to individual needs and context, and includes sustained support. Effective pedagogical approaches in MTED are underpinned by adult learning principles and establish a learning climate that fosters open and trusting relationships. Effective MTED is shaped by the espoused mentoring model or approach, with particular emphasis on understanding, building and sustaining mentoring relationships; and incorporating observing, practising, critically reflecting on and receiving feedback on mentoring.

Originality

The original and significant contribution of this study is the identification of key principles relating to the overall design of – as well as specific content, pedagogical approaches and supporting resources within – MTED programmes that have evidenced positive effects on mentors, mentees, mentoring and/or organisations.

Implications

The study will be helpful to practitioners designing, reviewing and evaluating MTED programmes, researchers seeking to enhance the sparse MTED evidence base, and programme commissioners.

Keywords

Mentor training; Coach training; Mentor development; Coach development; Mentor education; Coach education; Mentoring programme; Coaching programme; Mentee training; Coachee training.

Introduction

This aim of this paper is to synthesise international research on effective mentor training, education and development (MTED), to inform the future development of MTED for adults in educational contexts (e.g., schools, colleges, universities and youth work settings), and the associated research agenda. Since a wide variety of approaches to mentoring is practiced globally, we considered it important to adopt a definition of mentoring which was sufficiently broad to encompass all of these. We therefore define mentoring as a:

> 'facilitative or helping relationship intended to achieve some type of change, learning, and/or enhanced individual and/or organisational effectiveness' (Author ref, 2022, p.5).

In our view, this broad definition of mentoring also provides a broad definition of coaching: indeed, it was adapted from Smith *et al*.'s (2009) definition of coaching. Moreover, it has been argued that some approaches to mentoring have more in common with some approaches to coaching than they do with other approaches to mentoring, and vice versa (Author ref, 2023) and that:

> 'mentoring studies which only draw on previous research into mentoring, and coaching studies which only utilise previous research into coaching, may lack rigour insofar as they are only partially situated in their relevant research contexts' (Ibid, p.5).

Therefore, our MTED analyses incorporates sources related to the training, education and development of both coaches and mentors. We have, however, restricted our analyses to MTED which relates to one-to-one relationships, the most common form of mentoring and coaching. This is to provide a sufficient degree of focus and exclude what might be quite different approaches to training, education and development in the context of group mentoring or coaching programmes.

To enhance readability in this paper, we use the terms mentoring, mentor, mentee and MTED to be inclusive of coaching, coach, coachee, and coach training, education and development. Hence, in what follows, we generally only use the term coaching where we discuss our research design (e.g. literature search terms) or refer to specific coaching programmes, projects or literature.

The international research literature has shown that mentoring in education can enhance learning and development and impact positively on mentees' effectiveness, wellbeing and retention (Ingersoll and Strong, 2011; Kutsyuruba and Godden, 2019; Kraft *et al*., 2018). However, mentoring does not always bring these desired outcomes (Colley, 2002; Author ref, 2013). The extent to which such outcomes are realised depends on whether 'conditions for effective mentoring' are in place (Author ref, 2017; Nugent *et al*., 2023).

Conditions for effective mentoring have been found to include, amongst others, effective mentor selection and mentee-mentor matching (Wang, 2001; Yusko and Feiman-Nemser, 2008), the provision of dedicated time for mentors to undertake the mentoring role (Bullough, 2005; Lee and Feng, 2007), and various means of supporting the establishment of relational trust between mentees and mentors (Denton and Hasbrouck, 2009; Ng, 2012). One of the most frequently reported conditions for effective mentoring is whether mentors are trained – or effectively trained – for the role (Bullough, 2005; Crasborn *et al.* 2008; Lejonberg *et al*., 2015). However, studies suggest that the quality and take-up of mentor training is highly variable and, often, mentors do not receive adequate preparation for the role (Author ref, 2013; Thompson, 2016). Furthermore, there is a dearth of studies identifying what effective MTED involves, and the evidence base on the effects of MTED is sparse and underdeveloped (Aspfors and Fransson, 2015; Robinson and Author ref, 2017).

To extend this evidence-base we present a qualitative meta-synthesis of findings on the nature, key features and impacts of MTED and the contextual factors that modify potential impacts. We address the following research questions:

> *RQ1: What does existing research tell us about the nature, key features and impact of effective MTED?*

> *RQ2: What does existing research tell us about the contextual factors that enhance or impede the potential effects of MTED?*

We use the term 'MTED' to encompass both initial and ongoing programmes of training, education and/or support, where the primary aim is to prepare and/or support the development of mentors. By 'effective' we mean where the primary study provides evidence from rigorous research of the positive impact of the MTED on mentors, the mentoring relationship, mentees and/or their organisations.

Methodology

An adaptive theory methodology (Layder,1998), combining deductive and inductive approaches, was deployed to undertake a qualitative multi-level meta-synthesis of findings from three studies conducted sequentially: (1) an initial systematic review of international literature published between 1/1/2010 and 31/07/20, together with aand secondary analysis of studies which included research evidence on MTED; (2) a general inductive analysis (Thomas, 2016) of interviews of leaders of large-scale effective MTED programmes with sufficient good quality evidence of impact conducted in September 2020; and (3) a follow-on systematic review of literature published between 1/08/20 and 12/05/23.

Adaptive theory is based on the premise that existing '*theory both adapts to…incoming evidence while the data itself is simultaneously filtered through, and is thus adapted by, the prior theoretical materials*' (Layder, 1998, p. 5). Using this iterative approach within, and across, the individual studies was particularly apposite for constructing theory over time from three separate sequential analyses. This ensured that all data sources and analyses contributed to the findings presented in this paper. The initial review enabled the construction of tentative qualitative hypotheses about effective MTED. The approach to designing and analysing the interviews with leaders of effective MTED programmes was informed by these hypotheses. In the light of the interview findings there was some re-organisation and re-shaping of the original hypotheses, and an analytical framework was developed for the meta-synthesis of findings from all three studies.

Ethical approval was granted by the University of Brighton, and the research undertaken in accordance with the British Educational Research Association's Ethical Guidelines (BERA, 2018). Below we outline, and provide a rationale, for our data generation and analysis methods. Limitations of the research are discussed in the penultimate section of the paper.

Initial systematic literature review and secondary analysis of data

The review of literature followed systematic review principles and processes to ensure consistency, transparency and rigour. The approach is summarised below and discussed more fully in Author ref (2020). Screening, filtering and reviewing processes adhered to a PRISMA-P protocol (Moher et al., 2009). In line with good practice in conducting systematic reviews (Tomlinson and Parkes, 2021), six international mentoring and coaching researchers, identified by the authors, and twelve significant providers of MTED programmes in England, identified by the Department of Education or the Education and Training Foundation[i],were consulted on potential literature sources. Application of the search syntax retrieved 278 unique sources which were progressively reduced to 21 (17 academic; 4 grey literature) by applying inclusion/exclusion criteria in a three-stage process. The full texts of the selected sources that met the criteria of relevance to research aims, recency (published since 2010), written in English, sufficiency of detail on the MTED provision and rigorous evidence of MTED impact. The criteria for assessing rigour published in the UK Research Excellence Framework (REF, 2019) was applied by the authors, who had significant experience of using the framework. This framework was selected as it can be applied across different methodological approaches and disciplines.

In line with the adaptive theory methodology, a critical summary template for the review of literature and secondary sources was adapted from versions used in earlier MTED research. This enabled the production of inclusive data summaries that could be compared. Following standardisation checks between reviewers, critical summarises were produced for the 13 MTED programmes covered by the sources and each of the two meta-syntheses (Aspfors and Franson, 2015; Sheri et al., 2019). Included literature spanned MTED for mentors of beginner and experienced teachers, higher education researchers, medical and dental educators, and young people. Sources are identified by a single asterisk in the reference list and further details provided in Supplementary_materials_appendix_1.

Eight studies of mentoring, undertaken by the authors of this study, which were completed between 2014 and 2020 and included research evidence relating to MTED were selected for secondary analysis (SA) (Heaton, 2004; Seale, 2011). Although accessibility and ethical permission considerations led to only authors' studies being included, they were selected as the research team were aware that they included relevant findings. Four studies focused on mentoring in the Further Education and Training sector - SA1 (Author ref, 2015; Author ref, 2020); SA2 (Manning, 2015; Author ref, 2017); SA3 (Author ref, 2017) and SA8 (Author ref, 2020), two on teacher mentoring in primary and secondary education - SA5 (Author ref, 2019a) and SA6 (Author ref, 2019b), one on head teacher peer mentoring - SA7 (Author ref, 2019c) and one on mentoring across professions - SA4 (Author ref, 2016). Further details of the studies are summarised in Supplementary_materials_appendix_2, and related literature identified by a triple asterisk in the reference list.

Identification of key themes and emerging findings on the nature, key features and impacts of effective MTED programmes and the factors that enhanced and/or impeded those impacts from the literature and secondary analysis critical summaries was initially undertaken independently by the authors. Themes and findings were subsequently agreed through team discussion and an annotated list produced based on discussion and individual written analysis notes. This was reviewed by all authors and original sources were accessed, as necessary, to confirm accuracy.

Follow-on systematic literature review

For consistency, the searching, filtering, reviewing protocol, critical summary template and verification checks used in the initial review were also applied in the follow-on review, which synthesised literature published since the initial review. The initial search retrieved 107 unique sources, which through the application of inclusion/exclusion criteria were reduced to seven academic sources. Included literature spanned MTED for mentors of: beginner teachers; applicants to, and students in, higher education; and young people. The sources are indicated by a double asterisk in the reference list and further information provided in Supplementary_information_appendix_3.

A co-constructed analytical summary of additional evidence on the nature, key features and impacts of effective MTED programmes and the factors that enhanced and/or impeded those impacts was produced from the critical summaries. Original sources were accessed to support accuracy when necessary.

Effective MTED leader interviews

Five leaders of effective MTED programmes were selected from the 13 that met the criteria for inclusion in the initial systematic review. The criteria for selection were that the programmes were: well-established (at least four years) large-scale (more than five hundred completions) and for which the associated literature included in the initial review evidenced strong impacts through rigorous

research. All five leaders agreed to participate in semi-structured interviews. Three led programmes developed in the United States – Entering Mentoring (EM) (House *et al.*, 2018; Pfund *et al*., 2013; Pfund *et al.,* 2015a; Pfund *et al.*, 2015b; Spencer *et al.*, 2018); CO-Mentor (CO-M) (Nearing *et al.*, 2020); and Preparing for Mentoring (PFM) (Garringer *et al.,* 2015; Kupersmidt *et al.,* 2017). Mentoring Beginner Teachers (MBT) (Beutel *et al.,* 2017; Willis *et al., 2019*) was an Australian programme, and ONSIDE mentoring (SA5-8) was developed in England. EM and CO-M provided MTED in higher education, MBT and ONSIDE trained mentors for beginner teachers and additionally, ONSIDE trains experienced teachers and leaders, and PFM focuses on young people. CO-M trains mentees alongside mentors, as do some iterations of ONSIDE. Further information is provided in Supplementary_Materials_Appendix_4.

A general inductive analysis (Thomas, 2016) of the interview transcripts was undertaken to draw out detailed insights into effective MTED design and contextual factors that enhanced or impeded effects. Following an iterative process of close reading and development of inductive codes, codes were organised into a draft framework for synthesising emergent findings. The framework, populated with evidence from the interviews, was reviewed and verified by different members of the research team.

Meta-synthesis

As noted earlier, in line with adaptive theory, the analytical framework for the final meta-synthesis was developed progressively and iteratively as theory on effective MTED was built from each of the three studies. All authors reviewed and contributed to the final iteration of the meta-synthesis findings. The analytical framework populated with the findings from the three studies was reviewed for common and potentially contradictory themes. Factual and interpretative checks were undertaken using the interview transcripts, critical summaries and original sources to enhance the dependability of the final synthesis (Guba and Lincoln, 1994).

In the following sections we present the most prominent themes to emerge from the meta-synthesis, which relate to overarching design principles, pedagogy, content, supporting resources, and contextual factors found to enhance or impede MTED effects. Space constraint means that it is not possible to present all the sources that contributed to a meta-finding. Instead, we provide a maximum of three exemplar citations, drawn from the literature, secondary analysis and/or interviews to support individual findings.

To enhance trustworthiness (Guba and Lincoln, 1994), we make transparent the effects that are likely to be achieved if the features of 'effective MTED' found in the meta-synthesis are adopted by, first, briefly summarising the findings on MTED effects in the initial and follow-on reviews. Interview data is generally omitted from this section as impact data were presented in the associated papers which were part of the initial review.

MTED effects

The most frequently reported positive effects, attributed to MTED, related to mentors, mentoring relationships and mentoring practices. Evidence indicated mentors' enhanced understanding of mentoring roles and practices (Beutel *et al.,* 2017; Kupersmidt et al., 2017; van Ede *et al.,* 2023), including inclusive mentoring practice (Brace *et al.,* 2018; House *et al.,* 2018; Sheri *et al.,* 2019), and the needs of their mentees (SA3; Aspfors and Fransson, 2015; HEE Y&H, 2017). Increased confidence and self-efficacy as a mentor were also reported (Kupersmidt *et al.*, 2017; Vincent, 2018; Whiting and Wickham 2020), as were a range of skill enhancements. These included: critical reflection (Aspfors and Fransson, 2015; Beutel *et al.*, 2017; Ingleby, 2014); interpersonal and communication

skills (Aspfors and Fransson, 2015; Nearing *et al.,* 2020; van Ede *et al.,* 2023); and specific mentoring skills, particularly goal setting, building mentees' confidence and providing effective feedback (Beutel *et al.*, 2017; Cabezas *et al*., 2023; Matthews, 2016). Wider impacts included improved professional practice (HEE Y&H, 2017; Nearing *et al.,* 2020; Sheri *et al*., 2019) and enhanced status, leadership skills and influence (Beutel *et al.,* 2017; Haqqee *et al*., 2020; Willis *et al.,* 2019).

Positive impacts on mentoring relationships and practice (SA4; Sheri *et al.,* 2019; Willis *et al.,* 2019) included: aligning practices more closely with the model or approach to mentoring advocated in the MTED (SA2,4,5-8; Matthews, 2016; Melton *et al*., 2019; van Ede *et al.,* 2023); tailoring mentoring more closely to mentee needs, with more active listening and open conversations (House *et al.*, 2018; Pfund *et al*., 2013; van Ede *et al.,* 2023); and shifting the focus of conversations (Melton *et al.*, 2019; Miller *et al.,* 2019).

Fewer studies provided evidence of impacts for mentees, and, with the exception of MTED programmes that included mentee training (SA5&6; Nearing *et al.*, 2000), it was often unclear whether such outcomes could be attributed, in full or part, to MTED, the enactment of mentoring or other developmental activities. Practice-related changes included enhanced knowledge and understanding (Miller *et al.,* 2019; HEE Y&H, 2017) and improved skills, enhanced competence and effectiveness (Aspfors and Fransson, 2015; Nearing *et al.,* 2020; Sheri *et al*., 2019). Enhanced retention and career progression (Matthews, 2016; Nearing *et al.*, 2020; Sheri *et al.,* 2019), and improved resilience, well-being and work-life balance (SA3; HEE Y&H, 2017; Willis *et al*., 2019) were also identified.

Evidence of impact on organisations was limited. While there was convincing evidence of the positive impact of CO-M MTED on organisational culture (CO-M Leader), generally when enhancements to professional learning cultures or improved staff retention were reported (SA4&5; HEE Y&H, 2017; Matthews, 2016) it was unclear to what extent this was attributable to MTED.

Nature and key features of effective MTED

Design principles

We consider design principles to be the core beliefs that guide MTED providers' decisions about their programme's pedagogy, content, and resources. This section draws particularly on the interviews of leaders of effective MTED programmes, who provided in-depth insights into the design principles they perceived to be critical in generating positive effects. These principles were also evident across some sources in the initial and follow-on reviews, although they were not necessarily labelled as such, and explanations were more limited.

The first principle, advocated strongly by all the interviewees and implicit within most literature and SA sources, was that that MTED should be informed by empirical and/or theoretical evidence. Such evidence was sometimes presented as a named model of mentoring with a set of design principles, such as the ONSIDE Framework (Author ref, 2017) deployed in SA5-8, and Garringer *et al.*'s (2015) "Elements of Effective Practice for Mentoring" underpinning PFM. In other instances, a combination of evidence-based approaches to mentoring, such as Cabezas *et al.*'s (2023) use of Wang and Odell's (2002) theory-and-practice connection model and Bambrick-Santoyo's (2012) feedback model were deployed. Mentoring life-cycle theories (ONSIDE and PFM) and research relevant to the specific aims of the mentoring programme, for example persistence in science career paths (EM and CO-M) were also drawn on. In addition, MTED design was informed by broader psychological theory, for example, self-determination theory (Ryan and Deci, 2020) (CO-M leader; van Ede *et.al*., 2023), leadership and business theory (CO-M) and learning sciences (CO-M and PFM) were influential in underpinning

pedagogical approaches, as were the principles of adult learning. It is notable that irrespective of whether the evidence-base was aligned with a named mentoring model or not, the underpinning principles for mentoring advocated usually aligned with developmental and non-judgemental approaches (Author ref, 2022).

The second principle, that programmes should be the subject of rigorous research into their effectiveness, which is subsequently drawn upon to enhance them, was also strongly advocated by all the leaders of effective MTED programmes. Although, this principle was not highlighted in some literature sources, it is important to note that all the sources included in this study were selected because they reported robust research on MTED effectiveness.

The third principle, for which there was strong evidence from all three analyses, was that MTED should be tailored whilst maintaining its underpinning principles (Aspfors and Fransson, 2015). As the PFM expert noted '*One thing we've learned is that our general principles never change, but we keep swapping our examples*'. Effective MTED was tailored to participants and the work being undertaken by mentees. For example, MTED for mentors of beginner science teachers focused on mentors' *'understanding of the components of effective science instruction…[and] ability to use a palette of support strategies to guide novices in…instructional decision*' (Melton *et al*., 2019 p.25). Contextualisation to discipline and career stage was also evident, as was adaptation to organisational contexts (EM; Co-M). This was also illustrated by Whiting and Wickham's (2020) observation that MTED should focus on the '*reality*' of the context to avoid feeling '*thrown in at the deep end*' (p.108), and the ONSIDE leader's engagement with organisational leaders and sponsors prior to the programme. Tailoring to the wider policy context was illustrated in MBT, where new professional standards were embedded by co-designing and facilitating the programme with policy officers (Beutel et al., 2017).

The meta-synthesis did not find consensus on 'the ideal' duration, intensity and modality of effective MTED programmes. Turning first to duration and intensity, while some effective MTED programmes had a duration of two to three terms, others, that evidenced positive effects, provided relatively few hours of training prior to, or at the beginning of, mentoring relationships (Pfund et al., 2013; Kupersmidt, 2017; Spencer *et al.,* 2020). There was consensus though, that maximising the potential effects of upfront training required access to sustained support for mentors and mentees over the duration of the mentoring relationship (Miller *et al.,* 2019; Pfund *et al.*, 2015a). We suggest that the provision of some form of sustained support is a more useful design principle than trying to identify ideal duration and intensity. In some instances, sustained support was provided by an extended MTED programme that offered opportunities for critical reflection and guidance on the mentoring relationship and activities, addressed any issues that arose and prepared participants for ending the mentoring relationship (SA5-8; Brace *et al*., 2018; Matheson *et al.*, 2020). Alternatively, there were instances where sustained support was provided, as well as, or instead of, an on-going MTED programme, by MTED facilitators and/or mentor coordinators (Pfund *et al.,* 2015b; House *et al,* 2018). The importance of sustained support was highlighted by the MBT leader:

> '[It's] absolutely imperative that it's spread over a longer period of time…so people go away and practice and then bring back further discussion'.

While the PFM leader pointed to the need for ongoing feedback to mentors: *'feedback…both corrective, supportive and complimentary plays a pivotal and critical role in the maintenance of* [the mentoring] *relationship.'*

Turning to modality, there were differing views on the appropriateness of face-to-face and e-learning approaches. Face to face provision was considered necessary, by some, for practising

mentoring and receiving feedback from peers (MTB and ONSIDE), enabling sense-making, making connections to the mentees' practices, and developing a sense of community (Melton *et al*., 2019). Benefits of online provision identified included: '*convenience, autonomy, and engagement*' (Kupersmidt *et al*., 2017 p.210); '*delivering high-quality, engaging, standardized, easily accessible, and scalable education'* (Garringer *et al.,* 2015 p.48); and the accessibility of animated '*dynamic'* downloadable tools and model conversations (Melton *et al,* 2019 p.30). Findings from effective MTED that moved from face-to-face or blended modes to solely online due to the COVID-19 pandemic, reported that e-learning modality enabled mentor participation and learning, but that face-to-face components could trigger more developmental interactions (Cabezas *et al.*, 2023). There was some support for blended learning approaches which enabled different modes to be deployed, depending on the knowledge, attitudes, skills or behaviours being developed, scale of the programme and funding available (PFM; Melton *et al.,* 2019). In conclusion, we suggest that rather than trying to identify 'the most effective' modality, the underpinning principle should be that decisions on modality should reflect the programme's aims, scale and context.

A further potential principle that emerged was including mentees in MTED. There was limited evidence to support this principle, but that should not necessarily be interpreted as a lack of effectiveness. Only two MTED programmes (ONSIDE: CO-M) incorporated this principle, and both provided robust evidence of impact. In both instances the majority of the MTED was facilitated in groups comprising both mentors and mentees, although, apart from brief reflection activities, mentor/mentee pairings did not work together (SA5&6; ONSIDE; Nearing et al., 2020). The inclusion of mentees was reported to enable them to: become *'good professional learners'*, take joint responsibility for ensuring a positive mentoring relationship (ONSIDE); and work out what they needed and were prepared to do to achieve their goals (CO- M). An increased sense of accountability by mentors and commitment to engaging with MTED was also observed in joint training (CO- M).

Pedagogical approach and resources

The pedagogical approach evident in effective MTED was generally participatory and underpinned by adult learning principles (Knowles, 1978), as illustrated by the CO-M leader: '*we use adult learning principles. It's very experiential…it's very participatory. We really emphasise that everybody has so much wisdom in the room'*.

The interactive methods deployed included workshops, role-play, action-learning sets, seminars, keeping a reflective journal (Ingleby, 2014; Kupersmidt *et al.,* 2017; Sheri *et al.,* 2019), and shadowing of, and roleplay with, experienced mentors (Whitington and Wickham, 2020). MTED facilitators flexibly selected and tailored methods to match participants' needs and care was taken to ensure that training was an enjoyable positive experience (Whitington and Wickham, 2020).

Opportunities to observe, practice and receive peer feedback on mentors' enactment of the mentoring approach or model advocated by programme, was emphasised as enabling participants to apply, extend and deepen their understanding and skills (SA 5,6&7; Beutel *et al.*, 2017; Pfund *et al.,* 2013). This was usually facilitated through role play, use of videos and engagement with case study scenarios. Role plays sometimes included participants acting as observers and reverse mentoring where mentors and mentees swapped roles (ONSIDE).

Regular opportunities for critical reflection on the mentoring model or approach, participants' mentoring practice, challenges they had experienced, or where likely to encounter, and their potential solutions were also emphasised (Aspfors & Fransson, 2015; House et al., 2018; van Ede; 2023):

> 'What was critical was that we engaged the practitioners in discussions about the core issues and gave them time to talk with their peers about the challenges and solutions so that they could expand their own toolbox so…it was deeper' (EM).

Establishing a safe learning climate by building in opportunities for participants to interact and develop open and trusting relationships was perceived as crucial in enabling mentors to share, and mutually reflect on, their mentoring practice and learning and development (SA5-7; Brace *et al.,* 2018; Sheri *et al.*, 2019; MTB). As Aspfors and Fransson's review (2015, pp.82-84) found:

> 'Trusting, comfortable, supportive and stimulating relations among participants…are…crucial for professional learning…, it is therefore essential to organise enough space for the mentors to meet, interact, share their new experiences as mentors and build a culture of openness and trust.'

A further intention of pedagogical strategies that fostered relationship building was for participants to understand each other's work better and open up opportunities for future collaborative work (MBT, EM and CO-M).

There was some evidence, mainly for mentors of teachers, of the effectiveness of using videos of professional practice to support critical reflection and ensure consistency with the model of practice advocated for mentees (Aspfors and Fransson, 2015; Cabezas *et al.,* 2023).

Two of the MTED leaders (EM and PFM) emphasised the importance of pedagogical tools and resources that were 'sticky':

> 'We were reading the literature on pedagogy to think about strategies and methods for instruction [to] create content that was 'sticky' in the sense that it would carry with the person so that…they might have some general principles that they could keep with them….while they were doing mentoring…So we used a lot of pedagogical tools…we created acronyms,… mnemonics, [and] a visualisation of different concepts' (PFM).

While the term 'sticky' was not used widely, some descriptions of pedagogical models, tools and resources in other MTED indicates that they were likely to support 'stickyness'. For example: the ORID framework (Objective, Reflective, Interpretative and Decisional questioning) to help mentors structure conversations (MBT); Bambrick-Santoyo's (2012) steps to giving effective feedback (Matthews, 2016); and mentor-mentee agreements or compacts, which embed the espoused mentoring practices (ONSIDE, EM and PFM).

The provision of an extensive set of supporting resources, tailored to the participants and context of mentoring, that were often available online, was a key feature of effective MTED and valued by participants (Brace *et al.*, 2018; Cabezas *et al*., 2023; Spencer *et al.* 2018).

Content

The mentoring relationship, and the approaches and activities associated with the relationship in general and at specific stages in the life cycle of mentoring, provided the core content in nearly all effective MTED. Within this there was a central focus on enacting the espoused mentoring approach or model (SA 5-8; Garringer *et al.* 2015; Haqqee et al., 2020; Matthews, 2016). For example, the MBT leader emphasised support for mentors to implement a developmental approach by looking at styles of mentoring: '*we really highlight…that this is very much about getting the beginning teacher to problem solve rather than providing advice all the time*'.

There are strong interrelationships between programme content and the pedagogical approach and resources outlined above. To avoid duplication, we summarise the main themes relating to content of effective MTED in Table 1. As would be expected, the specific content of individual MTED programmes was tailored to the programme aims and context as well as the espoused mentoring approach or model.

Table 1 about here

Factors that enhance or impede potential effects of MTED

The meta-synthesis indicated that a range of contextual factors, external to the MTED programme, enhanced and/or impeded potential effects. Most factors related to the participants' organisational context. Firstly, senior leaders' understanding of, and commitment to, mentoring, and support for mentors to engage in MTED and enact the espoused mentoring model or approach was critical. Where there was understanding and support, time and space were generally provided for engaging in MTED, enacting mentoring, and in turn, positive effects were realised (SA4&5; Cabezas et al., 2023; House et al., 2018). Conversely, where there was a lack of commitment by senior leaders and no, or very limited time for mentors, effects were impeded (SA3; Sheri *et al., 2019;* Willis *et al, 2019*).

Secondly, the meta-synthesis indicated that organisational cultures, which are also dependent on senior leader attitudes towards professional learning, need to be conducive to effective mentoring, for potential effects of MTED to be realised (MBT; ONSIDE; EM; Co-M; Willis *et al.,* 2019). Interestingly, there was some, albeit limited, evidence of a positive and reinforcing relationship between effective MTED and organisational cultures that support MTED and mentoring:

> 'Those early career researchers [MTED participants]…They've moved into very senior leadership positions and...there's a network effect…[This has] materially changed this university. It significantly turned it into a mentoring culture, a collaborative culture' (CO-M).

Similarly, the EM leader highlighted the importance of contextualising MTED within longer-term sustainable organisational change, in this instance by providing training for MTED facilitators, which includes developing an implementation plan for mentoring in their organisation (Pfund *et al.,* 2015a; Spencer *et al.,* 2018).

Thirdly, there was some evidence that MTED effects were enhanced when training was provided for MTED facilitators (SA3; Spencer *et al.,* 2018; Matthews, 2016). There was also evidence of enhanced effect, in the relatively few instances, where direct support for mentors and mentees was provided by mentoring coordinators, either alongside MTED programmes, or following upfront training programmes (SA5; ONSIDE; PFM).

Finally, two factors related to the wider context - funding and alignment with government policy - had the potential to enhance or impede MTED effects. Significant funding enabled extensive development work, including evidence reviews, engaging mentoring and digital experts to produce high quality learning schemes and resources, and rigorous research into the effectiveness of the MTED programme (Kupersmidt *et al.,* 2017). However, funding alone was insufficient. Barriers such as a lack of organisational support or provision of sustained support for mentoring relationships could still impede effects. Even in well-funded MTED (MBT). MTED that aligned with policy agendas, such as the introduction of professional standards (Beutel et al., 2017), enhanced the status of the programme and often brought enhanced funding.

Research limitations and strengths

In common with all research projects, this study has methodological limitations. Firstly, restricting the databases searched and specific sources to those written in English, may have excluded some relevant publications. Secondly, not all sources provided full details of MTED features, nor evidence of the impact of specific features, so the data we analysed may not represent the entirety of all the included MTED programmes. Thirdly although our inclusion criteria for research quality were met for the rigour criteria, there was variation across the sources, and it was beyond the scope of our study to weight the evidence. Fourthly, while the interviews generated rich and valuable insights and interviewees led MTED programmes that had rigorous evidence of impact, the selection process and relatively small number of interviewees may mean that they do not fully represent the perspectives of all leaders of effective MTED programmes. Similarly, the secondary analysis, limited to studies for which the authors had consent for further research, may not represent the wider evidence base.

Despite its limitations, the study has several strengths, including the transparency and rigour of using an adaptive theory methodology to build theory from multiple sources and analyses, and adherence to systematic principles in the initial and follow-up literature reviews. In addition, trustworthiness (Guba and Lincoln, 1994) has been enhanced through the collaborative and transparent analytical steps taken throughout the individual- and meta- syntheses.

Discussion

The original and significant contribution of this multi-level meta-synthesis is the drawing out of key principles relating to the MTED design, together with a synthesis of the specific content, pedagogical approach and supporting resources, that are evident in MTED programmes found to have positive effects on mentors, mentees, mentoring and/or organisations. We summarise these in Table 2.

Table 2 about here

These findings resonate with and substantiate pertinent conclusions in the wider mentoring literature (e.g., Law et al., 2023; Searby and Brondyk, 2016). The principles and features provide useful guidance for new MTED providers, the review of existing programmes, organisational leadership teams and commissioners of MTED programmes. As the meta-synthesis has shown, there is no single MTED model that can be applied universally. Rather, each programme requires tailoring to the specific mentoring aims and context, the mentoring approach or model, organisations involved and wider policy context, whilst crucially adhering to the key design principles and evidence-informed pedagogical approaches, content and resources.

As indicated in Table 2 some key features appeared less frequently in the MTED programmes reviewed, but when they were present there was good evidence to indicate that they supported positive outcomes. One, incorporating training for mentees, was highlighted as very important in two MTED programmes, yet was not a feature in other MTED programmes. This indicates the need for commissioning programmes, and associated research, focused on effective practice in the training, education and development of mentees, which has been suggested can help mentees to cultivate an appropriate 'mentoring mindset' (Searby, 2014) and enable them to maximise the impact of the mentoring support available to them (Kochan, 2002; Tripses and Searby, 2008).

The review also drew out the factors that enhanced or impeded potential MTED effects. Senior leaders', who understood and were committed to mentoring, enhanced potential MTED effects by creating the culture and conditions necessary, including time, for MTED attendance and enactment and support of the mentoring relationship. As is frequently identified in the wider literature, this study found that a lack of senior leader support is an impediment to successful mentoring (Cunningham, 2007) as well as being detrimental to the effectiveness of other forms of professional development (Taylor et al., 2011; Boylan, 2018). An interesting finding from this study was

uncovering the symbiotic relationship between effective MTED and creating the culture and conditions necessary for both effective MTED and mentoring. Some attention had been paid to researching the key features of an organisational architecture to support mentoring (Cunningham, 2007; Author ref, 2020). This study suggests that research could usefully test the hypothesis that, by including a focus on cultural change in organisations, MTED can be more effective and sustainable.

A further factor found to impact on MTED effectiveness was the provision of sustained support for mentors and mentees either by the MTED facilitator or a mentoring programme coordinator who is responsible, amongst other things, for recruiting mentors, matching mentors and mentees, and supporting mentoring relationships (Koczka, 2017). The presence of such a role was limited in this study, but where it was in place positive effects were identified. This indicates that further research on the role and training, education and development of MTED facilitators and mentoring coordinators would be beneficial.

Finally, we note, the evidence of the positive impact of substantial and sustained investment on the quality and effectiveness of MTED. Our meta-synthesis suggests that policymakers, funders and other stakeholders need to consider what they and, with associated funding, MTED providers could do to ensure that favourable contextual conditions for MTED are established, so that the potential positive impacts of both MTED and mentoring are more likely to be realised.

Conclusion

In this paper we have presented a meta-synthesis of the findings of three studies: an initial review synthesising data from a systematic review of literature published between 1/01/2010 – 31/7/2020 and a secondary analysis of studies including research evidence on MTED; a follow-up systematic review of literature published from 1/08/2022 – 12/05/23; and interviews with leaders of effective MTED programmes. We have enhanced the evidence base by identifying overarching design principles and specific pedagogical approaches, content and supporting resources that the evidence indicates underpins effective MTED. We hope that this will be helpful to practitioners in designing and reviewing MTED programmes, funders commissioning programmes, and researchers seeking to further enhance the sparsely populated evidence base relating to MTED.

Disclosure statement
The authors report there are no competing interests to declare.

References

14 references relating to the authors' publications have been removed, this includes most references related to the secondary analysis of data

**Literature sources included in initial review.
**Literature sources included in follow-on review
***Literature sources related to the secondary analyses

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[i] [i]The Education and Training Foundation is the expert body for professional development and standards in Further Education and Training in England.

Table 1: Content of effective MTED

Content	Exemplar evidence	Includes / illustration
Developing participants' knowledge and understanding, attitudes towards, and skills in; building, nurturing, sustaining and ending mentoring relationships.	SA 5-8, Garringer *et al*., 2015; Sheri *et al.,* 2019.	Understanding the mentoring life cycle and appropriate approaches at each stage (PFM; Beutel *et al.,* 2017; van Ede et al., 2023).
Aligning mentor and mentee expectations and addressing misalignments.	House *et al.,* 2018; Kupersmidt *et al.,* 2017; Matheson et al., 2020.	Considering how personal and professional relationships may influence expectations (EM), acknowledging the knowledge and skills of mentees and the reciprocal nature of the relationship (ONSIDE), negotiating a focus for improvement and goal setting (all effective MTED interviewees).
Establishing deep relational trust and sustaining confidentiality in mentoring relationships.	Beutel *et al.,* 2017; ONSIDE.	''*Mentors were advised that mentees should be able to discuss their teaching and their work in a "safe" environment…[and] mentoring conversations should remain confidential'* (Beutal *et al.,* 2017, p.168-169).
Building interpersonal and communication skills.	Beutel *et al.,* 2017; Cabezas *et al.* 2023.	Structuring and framing mentoring conversations (SA4; Matthews, 2016; Melton *et al.,* 2019); communication skills - particularly active listening and questioning (Aspfors and Fransson, 2015; House *et al.,* 2018) and giving feedback (Brace *et al.,* 2018; Parker et al., 2021; Sheri *et al.,* 2019).
Balancing support and challenge.	Aspfors and Fransson, 2015; Beutel *et al.,* 2017; Sheri *et al.,* 2019.	In some programmes this additionally incorporated how to negotiate the conflict inherent in providing support, whilst also assessing mentees' practice (Ingelby, 2014).
Handling challenges, difficult conversations, ethical issues and dilemmas.	Aspfors and Fransson, 2015; Brace *et al.,* 2018: Sheri *et al.,* 2019.	How to challenge mentees appropriately (MBT) and the importance of creating and deepening the trust in mentor/mentee pairing to foster the necessary conditions for effective challenge (ONSIDE).
The professional work of the mentee and how mentors can best support this.	Miller *et al.* 2019, Parker et al. 2021, Whiting and Wickham 2020	Preparing mentors of beginner teachers to adopt developmental approaches to lesson observation and support mentees' development of reflective practice (Beutel *et* al., 2017; Cabezas et al., 2023; Ingleby, 2014). For programmes focusing on promoting mentees' academic career progression - CV building and making grant applications (House *et al*., 2018; Nearing, 2000; Pfund 2013).
Understanding equality and diversity, addressing issues, and working with diverse groups.	Brace *et al.,* 2018; Sheri *et al.,* 2019; Spencer et al 2020.	How diversity influences mentor-mentee interactions; the potential impact of assumptions, preconceptions biases and prejudices on the relationship and how to manage them; and engaging mentees in conversations about diversity to foster a sense of belonging (EM).
Developing plans.	Cabezas *et al.,* 2023; Parker *et al*., 2021; Willis *et al.,* 2019.	Plans for: own mentoring approach and activity (EM and PFM) or career development (Nearing, 2020); and/or implementing mentoring in their school (Willis *et al., 2019*).

		Supporting mentees to develop plans to improve their practices (MTB)

Table 2: Evidence on the nature and key features of effective MTED

Design principles

- Evidence-based – empirical evidence and theory.
- Ongoing research and evaluation to support further development.
- Tailored to the participants, the work being undertaken by mentees, the organisation/s where mentoring was enacted and the wider context while maintaining the underpinning principles.
- Linked to sustained support over the duration of the mentoring relationship.

Limited evidence of presence in effective MTED but good evidence of effect when present:

- Training mentees as well as mentors.

Mixed evidence

- Modality –mixed views on the respective effectiveness of F2F, online or blended modes but consensus that mode needs to be matched to the aspect of mentors' development being supported and the MTED scale and context.

Pedagogical approach and resources

- Participatory approach based on adult learning principles incorporating a range of interactive methods, including opportunities for participants to apply and extend their understanding and skills by:
  - observing, practising and receiving feedback on their enactment of the mentoring approach or model advocated by the MTED programme;
  - critical reflection on the mentoring approach or model and mentoring practice.
- Establishing a climate for effective learning and network building by providing opportunities for participants to interact and develop open and trusting relationships.
- Extensive supporting resources for learning and mentoring.

More limited evidence of the presence in effective MTED but good evidence of effect when present:

- Facilitation and resources designed to be 'sticky'.

Content

- The mentoring relationship:
  - enacting the espoused approach to, or model of, mentoring;
  - developing participants' knowledge and understanding, attitudes towards, and skills in, building, nurturing, sustaining and ending relationships;
  - aligning mentor and mentee expectations and addressing misalignment – including understanding how personal and professional relationships influence expectations, acknowledging the knowledge and skills of mentees and the reciprocal nature of the relationship, negotiating a focus and goal setting;
  - establishing deep relational trust and sustaining confidentiality;
  - building participants interpersonal and communication skills – including structuring and framing mentoring conversations; with particular focus on active listening, questioning and giving feedback;
  - balancing support and challenge, and, if appropriate, how to negotiate the conflict inherent in providing support, whilst also assessing mentees' practice;
  - handling challenges, difficult conversations, ethical issues and dilemmas.
- The professional work of the mentee and how mentors can best support this.
- Understanding equality and diversity and addressing issues.
- Developing plans for mentoring and/or supporting mentees to develop plans.

Effective mentor training, education and development: a qualitative multi-level meta-synthesis

Appendix 1: Initial systematic literature review: included sources

Table adapted from Table 1 in Author ref (2020), p. 15.

Critical Summary	AL/ GL*	Source	Data sources/Methods
1	AL	Aspfors, J. and Fransson, G. (2015), "Research on mentor education for mentors of newly qualified teachers: A qualitative meta-synthesis", *Teaching and Teacher Education*, Vol.48, pp.75–86. https://doi.org/10.1016/j.tate.2015.02.004	Qualitative meta-synthesis of published research on mentor education between December 2013 and May 2014 analyzing 10 research items in details.
2	AL	Beutel, D., Crosswell, L., Willis, J., Spooner-Lane, R., Curtis, E. and Churchward, P. (2017), "Preparing teachers to mentor beginning teachers: an Australian case study", *International Journal of Mentoring and Coaching in Education*, Vol.6 No.3, pp.164–177. https://doi.org/10.1108/ijmce-04-2017-0030	Qualitative case study of 17 mentors completing a mentor preparation programme, including individual interviews (n=11), a paired interview (n=2), and a focus group (n=4).
	AL	Willis, J., Churchward, P., Beutel, D., Spooner-Lane, R., Crosswell, L. and Curtis, E. (2019), "Mentors for beginning teachers as middle leaders: the messy work of recontextualising", *School Leadership & Management*, Vol.39 No.3–4, pp.334–351. https://doi.org/10.1080/13632434.2018.1555701	Data/methods as above.
3	AL	Brace, J. L., Baiduc, R. R., Drane, D. L., Flores, L. C., Beitel, G. J. and Lo, S. M. (2018), "Design, implementation, and evaluation of a multi-disciplinary professional development program for research mentors", *Mentoring & Tutoring: Partnership in Learning*, Vol.26 No.4, pp.377–399. https://doi.org/10.1080/13611267.2018.1530101	Mixed-methods study of 64 mentors who completed at least three of the six workshops in three cohorts filling out survey with quantitative and open-ended questions.
4	AL	Garvey, R.and Westlander, G. (2012), "Training Mentors - Behaviors which bring positive outcomes in mentoring", Passmore, J,.Peterson, D.B. and Freire, T. (Ed.s), *The Wiley-Blackwell Handbook of the Psychology of Coaching and Mentoring*, pp.243–265. https://doi.org/10.1002/9781118326459.ch13	Meta-synthesis of a wide selection of empirical studies from journals, book chapters, and PhD theses, grouped into themes and sub-themes.
5	AL	House, S. C., Spencer, K. C. and Pfund, C. (2018), "Understanding how diversity training impacts faculty mentors' awareness and behavior", *International Journal*	Secondary qualitative analysis of interviews with 135 trained mentors from 16 institutions (USA and Puerto Rico).

		of Mentoring and Coaching in Education, Vol.7 No.1, pp.72–86. https://doi.org/10.1108/ijmce-03-2017-0020	
	AL	Pfund, C., House, S., Spencer, K., Asquith, P., Carney, P., Masters, K. S., McGee, R., Shanedling, J., Vecchiarelli, S. and Fleming, M. (2013), "A research mentor training curriculum for clinical and translational researchers", *Clinical and Translational Science*, Vol.6 No.1, pp.26–33. https://doi.org/10.1111/cts.12009	Quantitative analysis of post-training survey of 135 mentors from 16 institutions.
6	AL	Ingleby, E. (2014), "Developing reflective practice or judging teaching performance? The implications for mentor training" *Research in Post-Compulsory Education*, Vol.19 No.1, pp.18–32. https://doi.org/10.1080/13596748.2014.872917	Mixed methods research of questionnaire data that has been gathered from 80 initial teacher training mentors and semi-structured interview data from eight mentors.
7	AL	Kupersmidt, J. B., Stelter, R. L., Rhodes, J. E. and Stump, K. N. (2017), "Enhancing mentor efficacy and preparedness through web-based pre-match training", *Journal of Nonprofit Education and Leadership*, Vol.7 No.3, pp.197–216. https://doi.org/10.18666/jnel-2017-v7-i3-7945	Randomised controlled trial of participating mentors (n=80) and waitlist control group (n=47) from 51 varied participating mentoring programmes.
	GL	Garringer, M., Kupersmidt, J., Rhodes, J., Stelter, R. and Tai, T. (2015), *Elements of effective practice for mentoring* (4th Ed.), Boston, MA: MENTOR: The National Mentoring Partnership. https://www.mentoring.org/new-site/wp-content/uploads/2016/01/Final_Elements_Publication_Fourth.pdf	Data/methods as above
8**	AL	Lyons, M. D., Jones, S. J., Smith, B. H., McQuillin, S. D., Richardson, G., Reid, E., and McClellan, A. (2017). "Motivation coaching training for instructional coaches: a pilot study of motivational interviewing skills training", *Mentoring and Tutoring: Partnership in Learning*, Vol. 25 No.5, pp.548–565. https://doi.org/10.1080/13611267.2017.1415796	Semi-randomised waitlist control study of 38 coach participants randomly assigned with some adjustment for coaches who couldn't make training dates.
9	AL	Melton, J., Miller, M. and Brobst, J. (2019), "Mentoring the mentors: Hybridizing professional development to support cooperating teachers' mentoring practice in science", *Contemporary Issues in Technology and Teacher Education*, Vol.19 No.1, pp.23-44.	Qualitative thematic comparison pre- and post-implementation of a hybridised MTED programme of five mentors' (1) transcribed mentoring conversations (n=17, nine pre- and eight post-

			implementation) and (2) written responses to two reflective prompts. Participants joined the programme after changes in response to the findings of Miller's *et al's* (2019) study (below).
	AL	Miller, M., Hanley, D. and Brobst, J. (2019), "The impacts of a research-based model for mentoring elementary preservice teachers in science", *Journal of Science Teacher Education*, Vol.30 No.4, pp.357–378. https://doi.org/10.1080/1046560x.2019.1573127	Mixed methods quasi-experimental, single-group, repeated measures study. Data sources: mentor (n=46) and mentee (n=11 5) surveys, mentoring conversations and case studies to examine impacts of mentoring training on mentors' beliefs about effective science instruction.
10	AL	Nearing, K. A., Nuechterlein, B. M., Tan, S., Zerzan, J. T., Libby, A. M. and Austin, G. L. (2020), "Training mentor–mentee pairs to build a robust culture for mentorship and a pipeline of clinical and translational researchers", *Academic Medicine*, Vol.95 No.5, pp.730–736. https://doi.org/10.1097/acm.0000000000003152	Quantitative analysis of annual, longitudinal, pre- and post-training evaluation survey of mentors (n = 56) and mentees: (n=64) from 3 cohorts of the mentoring programme at the University of Colorado Denver.
11***	AL	Pfund, C., Spencer, K. C., Asquith, P., House, S. C., Miller, S. and Sorkness, C. A. (2015a), "Building national capacity for research mentor training: An evidence-based approach to training the trainers", *CBE—Life Sciences Education*, Vol.14 No.2, pp. 1-12. https://doi.org/10.1187/cbe.14-10-0184	Multi-level quantitative analysis of facilitator training evaluation dataset (n=281) between 2006-2016 (surveys and data analytics)
		Spencer, K. C., McDaniels, M., Utzerath, E., Rogers, J. G., Sorkness, C. A., Asquith, P., & Pfund, C. (2018), "Building a sustainable national infrastructure to expand research mentor training", *CBE - Life Sciences Education,* Vol.17 No.3, pp.1-11. https://www.lifescied.org/doi/10.1187/cbe.18-03-0034	Data/methods as above
12	AL	Sheri, K., Too, J. Y. J., Chuah, S. E. L., Toh, Y. P., Mason, S. and Radha Krishna, L. K. (2019), "A scoping review of mentor training programs in medicine between 1990 and 2017", *Medical Education Online*, Vol.24 No.1, pp.1-16. https://doi.org/10.1080/10872981.2018.1555435	Scoping review of literature based on Levac et al.'s (2010) refinement of Arksey and O'Malley's (2005) framework for scoping reviews, including 68 studies from 1990-2017 on mentor training in medical education.
13	GL	Health Education England (2017), *Evaluation of the Health Education England Yorkshire and the Humber (HEE Y&H) PGMDE Coaching Scheme.* Available at	Analysis of telephone interviews with seven coaches and seven coachees and other data provided by the

		https://www.yorksandhumberdeanery.nhs.uk/sites/default/files/coaching_scheme_evaluation_report_2017.pdf (accessed 5 August 2020)	leaders of the Postgraduate Medical and Dental Education (PGMDE) coaching scheme.
14	GL	Matthews, P. (2016), *Incremental coaching in schools. Small steps to professional mastery: An evaluation and guide for leaders*, Ambition School Leadership. Available at https://s3.eu-west-2.amazonaws.com/ambition-institute/documents/Incremental_coaching_-_full_report.pdf (accessed 2 August 2020)	Mixed methods study including survey of coach participants (n=128), interviews with coaches, coaches and senior leaders (over 30), observation of lessons and coaching observations and document review.
15	GL	Vincent, K. (2018), "Researching the impact of changes to mentoring approaches within a large initial teacher education partnership", *CollectivED Working Papers*, *4*, pp.18-24, Leeds Beckett University. https://www.leedsbeckett.ac.uk/-/media/files/research/collectived/collectived-june-2018-issue-4.pdf	Thematic analysis of data generated on perspectives of mentoring from: individual mentor conversations (n=9) - which included elicitation exercises; structured group discussion at area meetings of one university/school partnership: and related documents and data.

Notes:

*AL=Academic literature; GL = Grey literature

**CS8 found no impact of the MTED on which it focused but was retained as this was a rigorous study and can be reliably drawn upon to identify issues that need to be addressed in MTED design.

***Whilst CS11 is related to and part of the same overall project as CS5, they have different foci so separate critical summaries were constructed.

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Appendix 2: Initial review secondary analysis sources

Study No.	Focus	Associated literature	Data sources/methods
SA1	Mentoring and Coaching Teachers in FTE Sector (2014-15)	Author ref (2015) Author ref (2020)	Mixed methods study comprising interviews with teachers, mentors and other stakeholders (n=40), and a national teacher survey (n=392).
SA2	Judgemental and Developmental approaches to mentoring in Post-Compulsory Initial Teacher Training: An exploration into mentors' and mentees' perceptions of their relationship (2014-*15)*	Manning, C. (2015) *Judgemental and Developmental approaches to mentoring in Post-Compulsory Initial Teacher Training: An exploration into mentors' and mentees' perceptions of their relationship*. University of Brighton. MA Thesis. Author ref (2017)	Case study of trainee teachers and mentors on an Initial Teacher Education programme at a further education college in the south of England. Data generated from initial survey of 22 trainees, from which seven trainees and their mentors also participated in part-structured individual interviews and direct observation of one of their mentoring meetings. Four trainees and four mentors also completed a follow-up email survey.
SA3	Teacher Mentoring in Further Education (FE) Initial Teacher Education (ITE) in England: the availability, take up and impact of mentor accreditation (2016)	Author ref (2017)	Mixed method study including: secondary analysis of interview transcripts from two studies of mentoring (n=52); internet searches of providers of mentoring qualifications and professional recognition schemes; email communications with key stakeholders (n=6); telephone interviews with providers of mentoring qualifications and accreditation schemes (n=6); online survey of university leads for FE ITE providers

			(n=8); online survey of mentors in FE Colleges (n=20) in England.
SA4	Teacher mentoring: What can the education system learn from mentoring practice in other sectors? (2015-16)	Author ref (2016)	Case studies of 10 mentoring programmes across six countries, incorporating interviews with MPCs, mentors and mentees (n=32), and documentary analysis.
SA5	Introducing, Evaluating and Embedding ONSIDE Mentoring at [Mill] School (2018-19)	Author ref. (2019a)	Mixed methods study including a baseline mentee survey (n=14), focus groups with mentors (n=5) and mentees (n=5), interview with MPC, and final survey with mentees (n=13) and mentors (n=12).
SA6	Introducing, Embedding and Evaluating ONSIDE Mentoring at [Rousseau] Academy Federation (2018-19)	Author ref (2019b)	Mixed method case study comprising: mentee baseline survey (n=9); mentor and mentee focus groups (n=8); Mentoring Coordinator interview (n=1); direct observation of a mentoring meeting (n=1); end of project mentor and mentee survey (n=13).
SA7	Brighton & Hove Head Teacher ONSIDE Peer Mentoring Pilot (2018-19)	Author ref (2019c)	Mixed method case study comprising: mentee baseline survey (n=8); Mentoring Coordinator interview (n=1); direct observation of a mentoring meeting (n=1); end of project mentor (n=8) and mentee (n=10) survey.
SA8	Further Forces (Troop resettlement to education and training careers) Mentoring Programme (2017-21)	Author ref (2020)	Mentor (n=7) and mentee (n=7) surveys.

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Appendix 3: Follow-up review sources

Critical Summary	AL/ GL*	Source	Data sources/Methods
1	AL	Cabezas, V., Pereira, S., Figueroa, C. and Straub, C. (2023), "Teachers' perceptions about the delivery and methodology of a blended learning mentor training course: a case from Chile", *International Journal of Mentoring and Coaching in Education*, Vol.12 No.2, pp.177–193.	Mixed methods study. Data generated from: surveys of mentors (n=98 for participants in blended learning mode and n=75 for participants in e-learning adaptation due to COVID-19 pandemic); surveys of their mentees (n=20 for mentees whose mentors had participated in the blended learning mode and 54 for mentees whose mentor had participated in the e-learning mode); and post-course interviews (n=11) in three schools with mentors, and mentees and their school leaders.
2	AL	Haqqee, Z., Goff, L., Knorr, K. and Gill, M. B. (2020), "The Impact of Program Structure and Goal Setting on Mentors' Perceptions of Peer Mentorship in Academia", *Canadian Journal of Higher Education*, Vol.50 No.2, pp.24–38. https://doi.org/10.47678/cjhe.v50i2.188591	Surveys of undergraduate peer-mentors' experiences of two mentoring/mentorship programmes within one university (curricular peer-mentoring program n=54; non-curricular peer mentoring program n=49).
3	AL	Matheson, D. W., Rempe, G., Saltis, M. N. and Nowag, A. D. (2020), "Community engagement: mentor beliefs across training and experience", *Mentoring & Tutoring: Partnership in Learning*, Vol.28 No.1, pp.26–43.	Quantitative study. One-way repeated measures of variance (ANOVA) to test changes in mentors' (n=16) belief pre-training, post-training and at the the end of mentoring relationship.
4	AL	Parker, A. K., Zenkov, K. and Glaser, H. (2021), "Preparing school-based teacher educators: Mentor teachers' perceptions of mentoring and mentor training", *Peabody Journal of Education*, Vol.96 No.1, pp. 65–75.	Thematic analysis of data generated from 32 exemplary mentors – incorporating participant reflections; module artifacts; and participant surveys.
5	AL	Spencer, R., Gowdy, G., Herrera, C., Heubach, J., Slep, A. S. and Cavell, T. A. (2020), "Web-based training for school-based mentors of military-connected	Data generated from two focus groups of military parents (total participants n=13), feedback on the pilot version of the MTED programme from the

		youth: A multi-phase development study", *Journal of Primary Prevention*, Vol.41 No.6, pp. 567–583.	projects's Development team (n=13) and MTED participants (n=11); and breif survey of second cohort MTED participants (n=29).
6	AL	van Ede, A. E., Claessen, R., van Gils, M., van Hoogstraten, C., van den Berg, I. and van Gurp, P. J. M. (2023), "The teacher as coach: An innovative, longitudinal training for (bio)medical educators", *Clinical Teacher*, Vol.20 No.2, pp.1–9.	Mixed methods study. Data generated from coaches (n=16) in : individual end-of-traning open text review of their development:, and pre- and post-training surveys. Data also generated from surveys of students coached by a non-participating teacher (n= 144) and students coached by a participant in the training(n=85).
7	AI	Whiting, J. R. and Wickham, S. (2020), "Does a training programme improve the perceived confidence and performance of student mentors in their delivery of a widening access to medicine programme?", *Widening Participation & Lifelong Learning*, Vol.22 No.3, pp. 88–112.	Mixed methods study with self-selected intervention and control groups. Data generated from intervention group in pre- and post- MTED surveys (n=10); one survey of the control group (n=13); and individual, post-MTED semi-structured interviews with intervention group (n=2) and the control group (n=2).

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Appendix 4: Interviews with leaders of effective MTED programmes

MTED programme	Developer	Focus of mentoring	Scale	Associated publications included in meta-synthesis
Mentoring Beginner Teachers (MBT)	Queensland University of Technology and state policy officers	Beginner teachers in their first year of professional practice in schools	4,000 mentors trained between 2014-19	Beutel, D., Crosswell, L., Willis, J., Spooner-Lane, R., Curtis, E. and Churchward, P. (2017), "Preparing teachers to mentor beginning teachers: an Australian case study", *International Journal of Mentoring and Coaching in Education*, Vol.6 No.3, pp.164–177. https://doi.org/10.1108/ijmce-04-2017-0030
ONSIDE mentoring (ONSIDE)	University of Brighton	Beginner and experienced teachers and school leaders depending on context	Used widely across national and international MTED programmes and particularly in England to train mentors of beginner teachers in schools and further education and training	See sources related to Secondary analyses – SA5-8 (Supplementary_information_appendix_2)
Entering mentoring (EM)	University of Wisconsin-Madison- Center for the improvement of mentored experiences in research	Higher education research staff typically in post-doctoral or junior faculty roles in science disciplines	Part of a suite of mentoring programmes for mentors that has supported research faculty and staff and in more than 200 universities and laboratories across the United States	House, S. C., Spencer, K. C. and Pfund, C. (2018), "Understanding how diversity training impacts faculty mentors' awareness and behavior", *International Journal of Mentoring and Coaching in Education*, Vol.7 No.1, pp.72–86. https://doi.org/10.1108/ijmce-03-2017-0020 Pfund, C., Branchaw, J. L. and Handelsman, J. (2015b), *Entering Mentoring: A Seminar to Train a New Generation of Scientists*, 2nd Ed., New York: Macmillan.

				Pfund, C., Spencer, K. C., Asquith, P., House, S. C., Miller, S. and Sorkness, C. A. (2015a), "Building national capacity for research mentor training: An evidence-based approach to training the trainers", *CBE—Life Sciences Education*, Vol.14 No.2, pp. 1-12. https://doi.org/10.1187/cbe.14-10-0184 Pfund, C., House, S., Spencer, K., Asquith, P., Carney, P., Masters, K. S., McGee, R., Shanedling, J., Vecchiarelli, S. and Fleming, M. (2013), "A research mentor training curriculum for clinical and translational researchers", *Clinical and Translational Science*, Vol.6 No.1, pp.26–33. https://doi.org/10.1111/cts.12009
CO-Mentor (CO-M)	University of Colorado	Early career researchers in clinical and translational sciences	500 mentees supported over 10 years	Nearing, K. A., Nuechterlein, B. M., Tan, S., Zerzan, J. T., Libby, A. M. and Austin, G. L. (2020), "Training mentor–mentee pairs to build a robust culture for mentorship and a pipeline of clinical and translational researchers", *Academic Medicine*, Vol.95 No.5, pp.730–736. https://doi.org/10.1097/acm.0000000000003152
Preparing for mentoring (PFM)	innovation, Research and Training (iRT)	Young people mentored by adults	Used across a very wide range of voluntary organisations, and in other contexts, across the United States and globally	Kupersmidt, J. B., Stelter, R. L., Rhodes, J. E. and Stump, K. N. (2017), "Enhancing mentor efficacy and preparedness through web-based pre-match training", *Journal of Nonprofit Education and Leadership*, Vol.7 No.3, pp.197–216. https://doi.org/10.18666/jnel-2017-v7-i3-7945 Garringer, M., Kupersmidt, J., Rhodes, J., Stelter, R. and Tai, T. (2015), *Elements of effective practice for mentoring* (4th Ed.), Boston, MA: MENTOR: The National Mentoring Partnership. https://www.mentoring.org/new-site/wp-content/uploads/2016/01/Final_Elements_Publication_Fourth.pdf

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