



Remote professional development:
Rapid Evidence Assessment

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The Education Endowment Foundation (EEF) is an independent charity dedicated to breaking the link between family income and educational achievement, ensuring that children and young people from all backgrounds can fulfil their potential and make the most of their talents.

The EEF aims to raise the attainment of children facing disadvantage by:

- identifying promising educational innovations that address the needs of disadvantaged pupils in primary and secondary schools in England;
- evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale; and
- encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

The EEF was established in 2011 by the Sutton Trust as lead charity in partnership with Impetus (formerly Impetus Trust) and received a founding £125m grant from the Department for Education. Together, the EEF and Sutton Trust are the government-designated What Works Centre for improving education outcomes for school-aged children.

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Executive summary

This rapid evidence assessment aimed to summarise the efficacy of remote **professional development** (PD) approaches to support school leaders and PD providers with decisions they are making about PD provision given social distancing requirements caused by the 2020 Covid-19 pandemic.

The review systematically searched for meta-analyses and systematic reviews to find the best evidence for fully **remote** and for **blended** PD approaches (key definitions of bolded terms are provided in Table 1 below).

The research questions posed were:

1. What evidence is available on the effectiveness of remote professional development approaches, compared to face-to-face, blended approaches and other remote approaches?
2. a) Does some face-to-face contact moderate outcomes in remote professional development approaches?
b) How do different remote professional development approaches moderate outcomes?
3. What can we learn from existing systematic reviews and meta-analyses about the characteristics of effective remote professional development implementation?

Limited evidence was discovered during the rapid review process. The review is structured to reflect the themes in the available literature. This report summarises the findings from 17 systematic reviews and meta-analyses answers under 5 key topic areas:

- Effectiveness of remote PD (RQ1 and RQ2a)
- Synchronous and asynchronous remote PD (RQ2b)
- Remote coaching, mentoring and expert support (RQ2b)
- Evidence on common approaches (RQ2b)
- Support from leadership teams (RQ3)

In each section, we have detailed the included reviews and listed findings and implications drawn from the evidence. As findings were drawn from education, welfare and public health professions, we have separated out the findings for professionals in schools in each section. Where relevant, we have also highlighted case studies from projects funded by the Education Endowment Foundation in which similar approaches have been rigorously evaluated in English schools.

Key findings and implications

1. Professional development can be supported effectively remotely

School professionals can gain knowledge and skills through remote PD, ultimately leading to gains in pupil outcomes.

Evidence is mixed as to whether remotely delivered PD is more or less effective than face-to-face PD, but specific benefits include lower costs and time incurred through travel. Other design principles are likely to be more important to PD outcomes than whether delivery is face-to-face or remote. There is no strong evidence that school-based PD should be delayed until it can be delivered face to face.

Blending synchronous and asynchronous delivery and blending face-to-face and remote learning may offer specific benefits by enabling trainees to feel part of a community while retaining travel cost savings, flexibility and social distance during remote and asynchronous elements.

2. Remote coaching, mentoring and expert support can be effective alone or as part of broader PD programmes

Coaching and mentoring can improve skills and knowledge of professionals when delivered remotely and may reduce feelings of isolation in professionals.

Remote or blended coaching, mentoring and expert support can be used to complement broader remote or blended PD programmes.

3. The use of video can enhance remote PD

The use of video is identified across a number of reviews as a particularly effective element of PD that enables teaching staff to review their own and reflect on others' actions in the classroom. The targeted use of videos generally increases the time trainees take to complete PD but is associated with gains in practitioner knowledge and pupil outcomes, suggesting the additional time might be spent engaging more closely with the content.

Video viewing is unlikely to be impactful in isolation and should instead be paired with other learning resources such as viewing guides or discussion with other professionals. One contradictory finding (though not limited to remote PD) suggests caution and monitoring is necessary when using video resources to support coaching conversations.

4. Interactive content and opportunities for collaboration hold promise for remote professional development

More interactive content tends to increase the time practitioners take to complete PD and is associated with better completion rates, knowledge and skill acquisition. Spaced education approaches (such as regular email surveys) could be particularly promising and may offer a low-cost way of enabling ongoing interaction with PD content. Conversely, barriers such as information being difficult to access can have a detrimental effect on user engagement.

Collaboration between colleagues may also improve PD outcomes through enabling reflective practice and collective problem-solving. For example, PD providers may include peer small-group discussion sessions following completion of individual tasks.

5. Remote professional development requires supportive school conditions (support from leaders, protected time, tech-specific training, platform ease of access)

School leaders have a critical role to play in ensuring enabling conditions are provided for remote PD to be successful. They can support staff to prioritise their PD by creating protected time within the working day for staff to engage with PD sessions or materials.

Schools should ensure staff have access to technology required for their PD and appropriate training in order to access this safely, efficiently and appropriately. PD outcomes are strengthened where the purpose of the PD, roles and expectations are clear; this may require co-ordination from the PD provider, trainee, and school leadership team.

Limitations

It is important to note the limitations of applying existing evidence to the current context. None of the studies examined measure impacts of remote PD during a global pandemic, and there are characteristics of the current situation that will be unique: the demands of responding to learning loss for many children, some teachers continuing to work from home, staff illness and other restrictions related to social distancing, and the possibility of further school closures.

In addition, there are other important limitations to the evidence. Few high-quality reviews have looked at remote PD so the evidence body was thin, and some of the included reviews combine evidence from practising professionals (continuing professional development) with pre-service PD, which is often based in universities and less relevant to decisions that school leaders are making about developing their staff teams. Other evidence comes from reviews of approaches that have the potential to be delivered remotely, but the reviews include studies where the approach is deployed in face-to-face training (for example, reviews of video use in PD). Seven of the seventeen included reviews relate to school-based professionals, with the remaining evidence coming from welfare and public health PD, which may be less relevant to schools. Reviews also include studies from across the world, with USA the most common setting.

The rapid nature of the review also means that it does not provide statistical analysis or comparisons between different approaches or reviews, but is instead a narrative summary of findings. One of the challenges this presents in interpreting the evidence is that it is difficult to make claims about the benefits of specific PD approaches. These limitations notwithstanding, this report aims to summarise evidence that may support schools and PD providers in making pragmatic decisions related to delivering professional development.

Background and rationale

As schools re-open and continue to operate in the context of Covid-19, the need for distancing may pose challenges to delivering professional development within school. Staff may be also unable to attend traditional face-to-face training outside school as national, local or personal circumstances may restrict movement, or schools may require teachers to be present in school.

Schools and training providers, including EEF Research Schools, **Promising Project** providers and active trial providers, are considering ways in which they can use remote learning techniques to continue providing professional development for teachers and other members of staff. There is no evidence review of remote professional development in this context for them to draw upon. There is an urgent need for evidence on:

- The qualities of successful remote learning techniques for professionals
- How to successfully implement remote learning to facilitate adult professional development
- How teachers and other school staff learn well when some or all training is remote

For the purposes of this rapid evidence assessment, the scope is limited to direct professional development and thus discounts simple procedural training (that does not aim to change pedagogical approaches) as well as leadership programmes. While the population of interest is school-based professionals, the search scope was broadened to include practising professionals in similar spheres - welfare and public health - as we believe there are generalisable mechanisms for effectively supporting adults (online or otherwise) to change their practice that are relevant across sectors. The review sought to find the best evidence on which remote PD approaches are most likely to improve professional knowledge and behaviour and, ultimately, pupil (and equivalent service beneficiary) outcomes. Additionally, the review explored the characteristics of effective implementation of remote PD.

Ideally a review of this scope would be conducted using an exhaustive systematic review. Given the urgent need for evidence now, a rapid evidence assessment was considered the most pragmatic solution as with two other recent reviews on remote learning (EEF, 2020a) and the attainment gap (EEF, 2020b). A comprehensive systematic review of professional development is due to be undertaken by the EEF in 2020-21, in order to publish a Guidance Report which will provide schools and PD providers with recommendations on how to effectively deliver professional development.

Table 1: key definitions

Professional development	Activities, tools and resources for improving professional practice with the aim of improving outcomes for their service beneficiary (pupils in the case of school-based professionals).
Remote delivery	Methods of developing professionals that take place without face-to-face contact.
Blended delivery	Remote learning is used for some content delivery/instruction while other elements are delivered in person. This model can be contrasted against face-to-face models, where independent study and practice is likely part of the programme but all instruction is delivered face-to-face.
Synchronous delivery	Live sessions requiring the professional to attend sessions (remotely or in person) at specific times. Examples include live online lectures and coaching phone calls.
Asynchronous delivery	Learning sessions and resources that can be accessed at the professional's discretion, as directed by a PD provider. Examples include a self-audit tool and pre-recorded online lectures.
Self-directed learning	Fixed tools, resources and activities that professionals can access independently of professional development programmes. Examples include teacher discussion forums and resource-sharing websites.

Further detail on the background and rationale for this review, including a theory of change, can be found in the protocol [here](#).

Methods

We undertook a rapid evidence assessment of existing systematic reviews and meta-analyses. We were guided by the Cochrane Collaboration Rapid Reviews Methods Group interim guidance on producing rapid reviews (Garrity et al. 2020), as well as the Civil Service Rapid Evidence Assessment methodological guidance (Government Social Research Service, 2009) and the Cochrane Collaboration's guidance on overviews of reviews (Pollock et al. 2020). A protocol for this Rapid Evidence Assessment, including theory of change, definition of professional development and more detail about the methodological approach taken, was published on the EEF website and is available [here](#).

Search criteria overview

The scope was limited to systematic reviews and meta-analyses in order to respond quickly to the policy challenge of social distancing due to Covid-19. The review was limited to studies from 1995 or later, as technology-based approaches from pre-1995 are unlikely to be relevant to current approaches.¹ To be included in the REA, a study had to meet the following additional criteria:

- Population:
 - Practicing professionals in education, welfare and public health (studies from any country)
- Intervention:
 - Direct PD where instruction is delivered remotely or partially remotely ('blended')
- Comparison:
 - Any comparison including blended approaches, face-to-face PD, other remote PD or a no-intervention control group
- Outcome:
 - Pupil or equivalent service beneficiary outcomes
 - Behaviour or knowledge change of the professional which is aimed at improving outcomes for pupils or relevant service beneficiaries
 - Other benefits for the professional such as changes to job satisfaction
- Study design:
 - Meta-analyses or systematic reviews of remote PD effectiveness or implementation of remote PD
- Other criteria:
 - Published since 1995
 - Published in English
 - Reviews published in peer-reviewed journals and grey literature

How the review was conducted

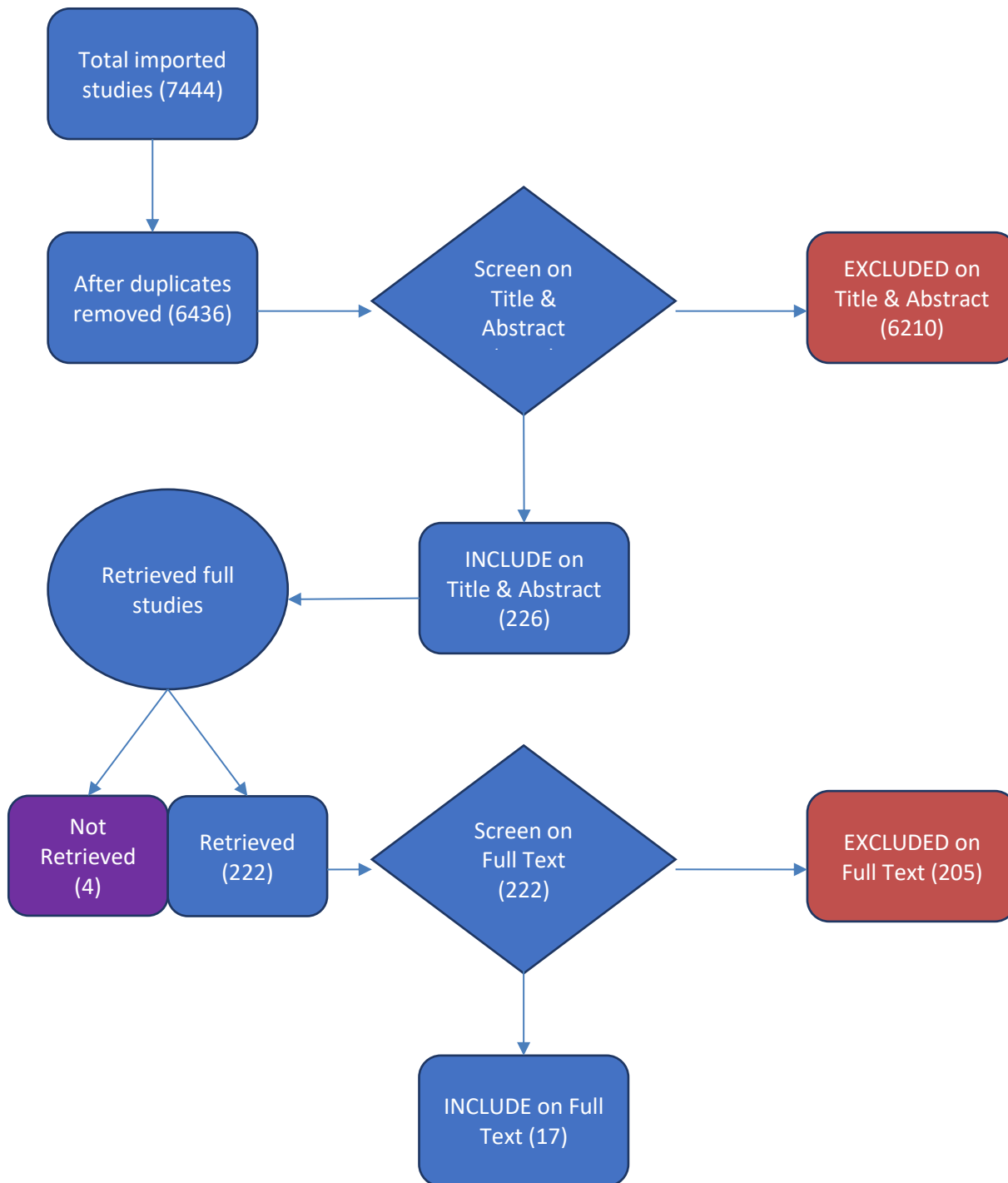
We undertook the following steps to produce the REA, as described in the protocol:

1. Searched for relevant studies, including searching bibliographic databases and known sources of systematic reviews.
2. Screened the search results for inclusion using the criteria described above in a two-stage process, first screening at title and abstract and then at full-text level.
3. Extracted data from each included systematic review and meta-analysis, including information on methodological and substantive features, results, specifically pooled or individual effect sizes and associated confidence intervals where presented, and any information around barriers and facilitators to successful implementation of remote PD approaches. Where effect sizes are presented, these are as reported in the original review.
4. Appraised each systematic review and meta-analysis for methodological quality, to make a judgement on how much confidence to place in the findings of each review.
5. Summarised the findings of each included review, grouped by the broad topic they address.

¹ Although our search criteria allowed for studies from 1995, the oldest included review was published in 2008.

Search Process Results

Figure 1: PRISMA diagram of search process results



The initial searches returned 7444 references. After removing duplicates and screening on title and abstract², 226 references were labelled for inclusion. We were unable to retrieve 4 references, which meant that 222 were screened on full text. Of these 222, 17 reviews were included in this REA. All 17 had data extracted. The findings from the 17 identified reviews are summarised below.

² At title and abstract 1978 studies were screened using the priority screening function in EPPI-reviewer. Following 100 excludes in a row using priority screening, and screening of a random sample of 30 of the remaining studies, the 4458 remaining studies were excluded.

Effectiveness of remote PD

The approach

This section examines the evidence base for fully remote PD compared to no PD, face-to-face instruction and blended PD approaches.

Findings and implications:

- Remote PD has the potential to improve professionals' knowledge and skills and ultimately improve outcomes for pupils (and equivalent service beneficiaries in other professions).
- Evidence is mixed on whether remote PD is more or less effective than face-to-face PD. Other design principles are likely to be more important to PD outcomes than whether delivery is face-to-face or remote.

Relevant studies

Review	School review?	Review focus	Number of studies	What does the review say?
Basma & Savage 2018	Y	Systematic review exploring the impact of teacher PD on student reading achievement, including 3 studies where remote video-based PD is compared to face-to-face PD	17 (3 remote)	Although not directly reported, 3 studies of remote PD are included, all with positive effects that are comparable to the overall effect size.
Hines et al 2016	N	A systematic review of interventions improving the research literacy of nurses	10	Same effect as face-to-face PD when filmed lectures are viewed remotely
Hundey et al 2020	N	Review of teaching-focused online and blended mentoring programmes for higher education faculty	17	Online and blended mentorship programmes have the potential to promote teacher knowledge and skills
Jackson et al 2018	N	Systematic review of web-based PD for behavioural health providers	45	There is evidence web-based PD has positive effects but face-to-face PD tends to be more effective
Kraft et al 2018	Y	Meta-analysis of teacher coaching programmes, including 13 virtual coaching programmes (10 of which relate to the My Teaching Partner programme)	60 (13 virtual)	Similar positive effect sizes for face-to-face and online PD (but this is a low confidence result as effects varied)
Lynch et al 2019	Y	Meta-analysis of STEM teacher PD including a comparison of PD with any online elements to face-to-face models on outcomes for students	95 (19 with online components)	While all types of PD improve outcomes for students, programmes in which participants completed a portion of the professional development online had weaker student outcomes, on average, as compared with those that did not include any online PD
Peng & Yan 2017	N	Meta-analysis of internet-based learning in public health PD	16	Internet-based PD is more effective than no PD and as effective as face-to-face PD, though effects vary between studies
Semwal et al 2019	N	Systematic review of digital education on smoking cessation management for health professionals	11	All studies find that digital education is at least as effective as traditional or usual learning. Blended learning appears to offer additional benefits.
Singh et al 2020	N	Systematic review of technology-based PD in evidence-based treatment for clinicians (mostly mental health professionals)	24	Technology-based PD is at least as effective as manual-based or in-person PD
Tudor Car et al 2019	N	Systematic review of digital PD on clinical practice guidelines	17	Digital education seems to be more effective than no intervention and at least as effective as traditional learning for improving participants' knowledge

How secure is the evidence?

Not all of the studies included in the review directly made statements about the effectiveness of remote professional development: only ten of the seventeen studies are included in this section. The evidence is limited by the small number of rigorous studies that have taken place, particularly for the PD of teachers. It is also notable that the evidence between reviews is contradictory regarding the relative effectiveness of fully remote, blended and face-to-face PD.

We conducted a quality assessment of each included systematic review and meta-analysis. The majority of the included reviews appraised the heterogeneity and quality or risk of bias of their included studies, with only one of the

ten reviews considered a low confidence review. We therefore have reasonable confidence in the findings in this section.

What does the evidence say?

Remote PD is found to be effective in improving a range of outcomes, including practitioner knowledge and skills and improving outcomes for pupils or other service beneficiaries (Hines et al., 2016; Jackson et al., 2018; Kraft et al., 2018; Lynch et al., 2019; Peng & Yan, 2017; Singh et al., 2020; Tudor Car et al., 2019).

The evidence on the relative effectiveness of remote and face-to-face PD is less consistent. Several studies (Basma & Savage, 2018; Hines et al, 2016; Kraft et al, 2018; Peng & Yan, 2017; Semwal et al, 2019; Singh et al, 2020; Tudor Car et al, 2019) find remote learning approaches to be at least as effective as face-to-face PD. However, two other studies contradict these findings, with Lynch et al. (2019) finding any online delivery component is associated with less improvement in outcomes for pupils compared to those whose teachers have taken part in PD with no online component and Jackson et al. (2018) similarly finding that online PD is less effective than face-to-face PD.

One review (Semwal et al., 2019) suggests blended PD may offer additional benefits to practitioner knowledge and skill over both fully online and face-to-face PD. This finding was based on 2 studies comparing blended to digital education and 3 studies comparing blended to usual learning. There was not enough evidence available to make assertions on the components of online learning associated with the greatest gains.

Implications for PD in schools

Three of the included reviews relate specifically to schools (Basma & Savage, 2018; Kraft et al, 2018; Lynch et al., 2019). They reflect the mixed picture in the wider literature: remote PD can improve both the knowledge of school-based professionals and pupil outcomes but it is unclear whether such PD will be as effective as delivering PD face-to-face. It is likely that the relative effectiveness is more related to the content and context rather than the format of PD. In the present circumstances, remote delivery is an appropriate and potentially cost-effective way of providing PD for staff. Certainly, there does not seem to be strong evidence that school-based PD should be delayed until it is possible to deliver face-to-face.

Relevant EEF-funded evaluations

onebillion:

The onebillion programme consists of two apps that are designed to support the acquisition of basic maths skills for children aged 3-6. It is an EEF 'Promising Programme' as children in the intervention group made 3 additional months' progress compared to a comparison group in an EEF trial. As children work mostly independently on the apps, the training for Teaching Assistants (TAs) is a simple one-off session plus phone support. In the EEF efficacy trial, the initial training was provided face-to-face.

In a pilot study moving training to a 100% online model, evaluators observed sessions to see how similarly the TAs ran the sessions compared to how the developer intended, turning the score for each observed session a 'fidelity' percentage rating. The programme was implemented with over 95% fidelity (similarity to how the developer intended) across both online and face-to-face conditions, with TAs in the online training group feeling confident and requiring less follow-up phone support than the comparison group. One (cover) TA who had not completed the training was observed at 70% fidelity, suggesting the training was effective in improving fidelity, though this finding should not be over-interpreted. Overall, the pilot suggests that straight-forward professional development can be transferred well to remote delivery.

Nuffield Early Language Intervention (NELI):

NELI is one of the most promising programmes the EEF has evaluated, following an impact of 3 months' progress demonstrated in two separate EEF trials. TAs are trained to deliver this 20-week programme which aims to develop reception children's early literacy skills.

NELI can be characterised as a blended professional development programme. There is an initial 2-day face-to-face group training session and a half-day optional face-to-face workshop, complemented by webinar training, online support, phone support and an online forum. In our trial, most TAs accessed the remote support provided while only a third chose to attend the follow-up webinar. The results of this trial demonstrate the blended PD model can be beneficial for school professionals and their pupils.

Synchronous and asynchronous remote PD

The intervention

Synchronous remote PD is live: the trainee accesses the PD at a fixed point in time. This could take the form of an online group discussion, a phone call with a mentor, or watching a live lecture. Asynchronous remote PD is accessed in the trainee's own time, for example pre-recorded lectures, discussion boards or interactive games. For the purposes of this review, asynchronous PD is facilitated. This can be contrasted to self-directed PD, where a professional may, for example, read a book or online manual in their own time, without direction from an external tutor, training body or manager.

Findings and implications

- There is insufficient evidence to conclude whether synchronous PD delivery is more effective than asynchronous. PD providers may wish to consider how to target the benefits of either approach to different aspects of PD.
- Several studies identify that the targeted use of synchronous PD can provide benefits – for example, in teacher coaching.
- There is also evidence of promise for asynchronous approaches – for example, through pairing asynchronous feedback with videos that allow teachers to review their own practice.

Relevant studies

Review	School review?	Review focus	Number of studies	Findings
Hundey et al 2020	N	Review of teaching-focused online and blended mentoring programmes for higher education faculty	17	Online and blended synchronous mentoring programmes have the potential to increase teacher knowledge and skills
Jackson et al 2018	N	Systematic review of web-based PD for behavioural health providers	45	Both virtual classroom (synchronous) and serial instruction (asynchronous) designs increase practitioner knowledge
Kraft et al 2018	Y	Meta-analysis of teacher coaching programmes, including 13 virtual coaching programmes (10 of which relate to the My Teaching Partner programme)	60 (13 virtual)	(Synchronous) virtual coaching supports teacher and pupil outcomes
Marsh & Mitchell 2014	Y	Review of the use of videos of classrooms in teacher PD	Unclear	Different benefits attributed to each approach with stronger evidence for asynchronous video use to support classroom observation

How secure is the evidence?

Two reviews (Kraft et al., 2018; Jackson et al., 2018) measured the impact of a professional development approach on practitioner outcomes. The other two reviews provided a narrative synthesis of approaches. While the reviews reported findings for both synchronous and asynchronous PD, none directly compared the impact of similar approaches delivered both synchronously and asynchronously, and none of the reviews conducted meta-regression or moderator analysis allowing for comparable effect sizes between synchronous and asynchronous delivery.

The inclusion criteria for two reviews may limit the relevance of the findings for schools and PD providers looking to support professional development while teachers are at home. In one case (Marsh & Mitchell, 2014), studies involving student teachers are combined with in-service teachers, which may mean the findings are not all relevant to in-service professionals. Furthermore, two reviews (Jackson et al., 2018; Marsh & Mitchell, 2014) focus on sessions being delivered remotely from the provider's perspective, but it is not clear whether some studies are included in which the content is remote from learners but a group of learners access the PD together (for example teachers viewing a video together).

We conducted a quality assessment of all included reviews. Only one of the reviews reported performing a comprehensive search of the evidence and using appropriate criteria to assess the quality and risk of bias in analysing the studies that were included in the review. We therefore do not have a clear understanding of the quality of the underlying research contributing to our conclusions.

What does the evidence say?

For individual PD, synchronous remote PD is found to be promising in both Hundey et al. (2020) and Kraft et al. (2018), which focus on one-to-one support from an expert professional in the form of mentoring and coaching respectively. In one paper that analysed an effect size (Kraft et al, 2018), the effect of virtual coaching on both teacher instruction and student achievement is comparable to face-to-face coaching, though this was not a secure finding. The lack of direct comparison with asynchronous one-to-one support means that it is not possible to identify to what extent synchronous delivery is contributing to the positive impact.

For group PD, there is evidence of promise for both synchronous and asynchronous delivery. Jackson et al (2018) find 10 studies using the synchronous 'virtual classroom' design with a live, remote facilitator and 37 studies using asynchronous 'serial instruction' design, whereby learners undertake tutorials in a set order. Practitioner knowledge was positive across both, but with a wider range for asynchronous serial instruction (-1.70 to 4.70) compared to the synchronous virtual classroom (0.16 to 1.34). One study which compared this method to serial instruction reported higher levels of burnout for the virtual classroom design. The review posited that serial instruction methodology could save costs as it does not require instructor facilitation.

Marsh & Mitchell (2014) focus on the use of video and discuss the potential benefits of both formats. Synchronous video viewing is seen as useful for teachers to view another teacher's classroom activity in real time, which can be paired with opportunities for live group observation (note the review includes some studies which use video for face-to-face group sessions and for this finding does not specify whether group observation would be face-to-face or accessed remotely). Asynchronous video watching is described as particularly promising as it can allow teachers to view their own practice and can allow repetition and reflection over time, including being used to demonstrate specific learning points.

Implications for PD in schools

Two of the included reviews studied school practitioners specifically (Kraft et al, 2018; Marsh & Mitchell, 2014). There is tentative evidence that synchronous coaching may be as effective when delivered remotely and several studies support the use of video in both synchronous and asynchronous remote PD, particularly to view teacher classroom practice.

Asynchronous delivery affords participants more flexibility in when they engage with the professional development. The tentative evidence available suggests this delivery style can be effective, so particularly as a response to restrictions caused by the Covid-19 pandemic and if professionals may have to access learning at home (with potential for temporary access problems or competing commitments), the inclusion of some asynchronous elements of delivery in training programmes might provide a pragmatic solution.

Remote coaching, mentoring and expert support

The approach

As well as making decisions about the mix of synchronous and asynchronous format of remote PD, school leaders and providers have a decision to make that is both a format and a content question: should expert support be provided remotely to enhance PD? This section explores the evidence for different types of remote support provided for professionals, including mentoring, coaching and other expert support.³ This can be provided on a one-to-one, one-to-many or many-to-one basis.

Findings and implications

- There is evidence that coaching and mentoring can improve skills and knowledge of professionals when delivered remotely and may reduce feelings of isolation in professionals
- Remote or blended coaching, mentoring and expert support can be used to complement broader remote or blended PD programmes

Relevant studies

Review	School review?	Review focus	Number of studies	Reported impact
Gentry et al 2008	Y	Review of implementation of technologically based mentoring and instructional coaching interventions for teachers	14	Mentoring facilitated by technology has strong potential for providing cost effective, sustained PD
Hundey et al 2020	N	Review of teaching-focused online and blended mentoring programmes for higher education faculty	17	Online and blended mentorship have the potential to promote teaching knowledge and skills
Jackson et al 2018	N	Systematic review of web-based PD for behavioural health providers	45	Ongoing support was associated with improvements in completion, knowledge, attitudes, skill and fidelity but mixed comparison to no support
Kraft et al 2018	Y	Meta-analysis of teacher coaching programmes, including 13 virtual coaching programmes (10 of which relate to the My Teaching Partner programme)	60 (13 virtual)	Both online and face-to face coaching improve teacher practice and pupil outcomes; online coaching may be equally effective (low confidence result)
Major & Watson, 2018	Y	Review of use of video to support in-service teacher PD	82	Video viewing of classroom practice impacts teacher cognition but only when combined with high-quality support
Singh et al 2020	N	Systematic review of technology-based PD in evidence-based treatment for clinicians (mostly mental health professionals)	24	Evidence on inclusion of expert supervision sessions or ongoing support was mixed

How secure is the evidence?

Six reviews explored the evidence around coaching, mentoring and the use of expert support. The oldest (Gentry et al., 2008) can be seen as a precursor to Kraft et al. (2018) as it calls for an exploration of the effect on pupils, which is studied in the more recent Kraft paper. The remaining reviews were all published within the last two years.

We appraised the quality of each included review. Four of the reviews report the risk of bias for individual included studies and only one (Singh et al., 2020) analyses and reports results separately by risk of bias. This is a weakness in the literature. Overall, three of the six included reviews received a low quality rating.

One of the papers (Kraft) calculates the impact of remote coaching approaches compared to face-to-face measures using pupil test results as an objective measure rather than teacher self-report gains.

Only two other reviews (Jackson et al., 2018; Singh et al., 2020) use methodologies suitable for making claims about the comparative effectiveness of other expert support approaches and in both cases they did not find primary outcomes were improved compared to comparison groups with no expert support, thus we are unable to make

³ There are several high-quality publications outlining the differences between coaching and mentoring and the ways different approaches can be implemented successfully. See for example the Chartered College of Teaching's *Teacher CPD Report*, Chapter 4. Given the scarcity of evidence found on remote coaching and mentoring approaches in this review, findings are loosely combined to give a general overview of evidence to school leaders on expert support in remote PD.

assertions as to the effectiveness of expert support as part of PD programmes. It should also be noted that neither of these studies is based in the school context. Other reviews explore qualitative evidence suitable for making scoping comments but not effectiveness claims.

This is an area where more research is crucial to understand the conditions under which expert support enhances professional learning, as noted in all included reviews.

What does the evidence say?

There is some evidence that coaching and mentoring approaches are feasible and can be effective when delivered remotely. Kraft et al. (2018) find a positive effect for online coaching based on 13 trials. The same paper observes no difference in effectiveness between virtual and face-to-face coaching, though these findings are tentative due to large standard errors, so impact results as compared to face-to-face coaching should be treated with caution. Similarly, studies included in Hundey et al. (2020) consistently report improvements in participants' attitudes, beliefs, knowledge, skills or practices following participation in online or blended mentoring.

The two reviews reporting effects of expert support compared to PD without this support (Jackson et al., 2018; Singh et al., 2020) both find a mix of outcomes in the studies reviewed, with some comparative studies finding no difference between groups with and without expert support. However, the authors stress in both cases that the intervention groups gained skill, knowledge and in some individual studies improved completion rates. It is suggested that the lack of comparative gain may lie in differences between the studies included within each review in: the intensity of the PD, frequency of sessions, duration of the programme and qualities of the expert practitioner. Both remain supportive of the inclusion of expert support in PD programmes. Singh states that 'ongoing support may improve clinician knowledge and connection with peers and trainers' while Jackson states: 'in situations such as web-based PD where there is a lack of face-to-face contact with trainers and peers, the interaction that ongoing support emphasizes may be even more pertinent.'

Specific benefits are discussed: a common problem with coaching programmes is that the relationship can be hampered if the coach is also the teacher's 'evaluator' (line manager or induction tutor) whilst virtual coaching enables the relationship to be separate from the school context (Kraft et al., 2018). A recent review of higher education teaching staff (Hundey et al., 2020) finds that mentorship can reduce feelings of isolation or promote community building among professionals.

Coaching, mentoring and expert support are often paired with other PD. One review notes ongoing support is associated with higher rates of course completion as well as higher fidelity (Jackson et al., 2018) while another (Kraft et al., 2018) finds that coaching programmes that are paired with group training have larger effects on pupil outcomes – though this latter finding includes studies of face-to-face coaching so might have less relevance to remote PD.

Implications for PD in schools

Coaching, mentoring and expert support are likely to be a feature of school-based PD and can be delivered remotely or partially remotely. Remote coaching and mentoring may enable school leaders to provide coaches or mentors who sit outside of the staff member's performance management processes. PD providers will need to consider the most effective and efficient use of expert support based on the content of their PD programme.

Evidence on common approaches

This section explores the review evidence on several features of remotely delivered PD programmes that were commonly mentioned in the literature: interactive content, use of videos, and collaboration with colleagues.

1. Interactive content

Findings and implications

- Increasing interactivity tends to improve completion rates of PD and may increase knowledge and skills
- More interactive content tends to increase the time practitioners take to complete PD, which may be due to closer engagement with the materials
- Spaced education approaches are particularly promising and may offer a low-cost way of enabling ongoing interaction with PD content

Interactive content				
Review	School review?	Review focus	Number of studies	What does the review say?
Cho et al 2020	Y	Systematic literature review describing technology's roles in classroom management and school discipline, including nine studies of PD using video and 5 studies using interactive simulations.	22 (16 relating to technology in PD)	Computerised and mixed-reality interactive simulations can support classroom management skills by increasing realism with low cost and risk to students
Cook et al 2010	N	Systematic review and meta-analysis of time and learning efficiency in internet-based PD	20	A range of features associated with making the content interactive (animations, short video clips, audio narration) improve knowledge gains and increase PD time length
Hines et al 2016	N	A systematic review of interventions improving the research literacy of nurses	10	Increased interactivity of the intervention improves effectiveness as does using educational or behaviour change theory to develop interventions
Tudor Car et al 2019	N	Systematic review of digital PD on clinical practice guidelines	17	Non-interactive courses are more likely to have high attrition and a spaced approach shows promise

How secure is the evidence?

We appraised the quality of each included review. Three of the four reviews are well-conducted systematic reviews with few limitations (Cook et al., 2010; Hines et al., 2016; Tudor Car et al., 2019). A final review has unclear criteria applied for establishing the quality of included studies (Cho et al., 2020). Two of the reviews (Cook et al., 2010; Cho et al., 2020) include studies concerning pre-service professionals, which makes it more difficult to generalise the findings to in-service professionals.

The only review relating to schools has a low confidence rating. Therefore, while the evidence in this area is relatively strong, a potential weakness is that this evidence may not transfer fully to the school setting.

What does the evidence say?

One review finds that trainees had higher knowledge scores in one study each where remote PD includes audio narration, video clips in short chunks or animations but that each of these additions mean professionals take longer to complete the PD; conversely, a study incorporating self-assessment questions before or after content delivery does not increase knowledge or time spent learning (Cook et al., 2010). It is concluded that internet-based instruction and non-computer instruction require similar time as instructional strategies which increase interactivity typically prolong learning time while enhancing learning outcomes. Supporting this finding, Hines et al. (2016) find increased interactivity is associated with better outcomes for nurses engaging with research, as is improving engagement through careful design of content based on educational or behavioural change theory. Cho et al. (2020) find that online classroom management PD can be enhanced by the inclusion of interactive content simulating the classroom experience.

Conversely, Tudor Car et al. (2019) find mixed results on whether interactive content improves attitudes, knowledge or skills. The heterogeneity is explored and it is discovered that completely non-interactive (often self-directed) courses such as website content were more likely to suffer attrition. While performance feedback was not associated

with significant comparative gains, three studies using spaced education delivered via regular email surveys or online simulation reported large beneficial effects.

One isolated but promising example is an adaptive design, whereby programming is used to change which content participants are shown based on their answers to questions. In a single study, it took participants 18% less time than a comparison group following the same curriculum without adaptive content while gaining comparable knowledge test scores (Cook et al., 2010). This approach may have limited transferability to school-based PD and is known to be difficult to design well but is worth consideration for topics where it may be relevant.

Implications for PD in schools

Increasing the opportunities for professionals to engage with content through making it more interactive is likely to increase the time taken for staff to complete the PD course and is likely to see benefits in terms of knowledge and skills gained and completion rates. PD providers may wish to consider using interactive simulations to cover practical content that benefits from repetitive practice, such as behaviour management.

2. Use of video

Video technology can be used synchronously or asynchronously to enable practitioners to view and reflect on their own practice, to view other practitioners' practice from a physical distance or at a later point in time and to allow live and pre-recorded PD sessions to be shared with remote trainees.

Findings and implications

- The use of videos in PD generally increases the time required for trainees but is associated with gains in practitioner knowledge and pupil outcomes, suggesting the additional time might be spent engaging more closely with the content.
- Video can be particularly helpful to enable teaching staff to review their own and reflect on others' actions in the classroom
- Video viewing is unlikely to be impactful in isolation and should instead be paired with monitoring tools and frameworks, other activities such as role playing and practice or discussion with other professionals.

Use of video				
Review	School review?	Review focus	Number of studies	What does the review say?
Basma & Savage 2018	Y	Systematic review exploring the impact of teacher PD on student reading achievement, including 3 studies where remote video-based PD is compared to face-to-face PD	17 (3 remote PD)	Students whose teachers receive remote PD through video exemplars show better results than control groups
Cho et al 2020	Y	Systematic literature review describing technology's roles in classroom management and school discipline, including 9 studies of PD using video and 5 studies using interactive simulations	22 (16 relating to technology in PD)	Video may help deliver content or provide learners with a sense of realism (by showing a real or role-played classroom) when coupled with comprehensive learning aides
Cook et al., 2010	N	Systematic review and meta-analysis of time and learning efficiency in internet-based PD	20	The use of short video clips improves knowledge outcomes but means PD takes longer
Kraft et al 2018	Y	Meta-analysis of teacher coaching programmes, including 13 virtual coaching programmes (10 of which relate to the My Teaching Partner programme)	60 (13 virtual)	Studies with video libraries of other teachers' classroom instruction used alongside coaching (N=14) had a lower impact than those which did not (but this finding includes face-to-face coaching)
Major & Watson, 2018	Y	Review of use of video to support in-service teacher PD	82 (est. 34 remote)	Video viewing of classroom practice impacts teacher cognition but only when combined with high-quality support
Marsh & Mitchell 2014	Y	Review of the use of videos of classrooms in teacher PD	Unclear	Video viewing and discussion can potentially enhance teacher learning but is dependent on the interactions and reflections amongst learners

How secure is the evidence?

Of the five reviews regarding the use of video technology in remote PD, three had methodological weaknesses that mean interpreting effectiveness of using video should be approached with caution. The highest quality rating was awarded only to the review not based in education (Cook et al., 2010). Two of the reviews (Cook et al., 2010; Cho et al., 2020) include studies concerning pre-service professionals, which makes it more difficult to generalise the findings to in-service professionals. There is, however, consistency between the five reviews, which all find evidence of promise that videos can be used to support PD.

In contrast, one well-conducted school-focused review (Kraft et al., 2018) compares coaching programmes. Programmes where video libraries of other teachers are used to support coaching conversations are compared against coaching programmes which do not use video libraries. The findings in this review contradict those of the five included studies, with a smaller positive effect on pupil outcomes seen for coaching programmes which include video libraries. The review does not separate out findings for remote and face-to-face PD for this analysis so it is not possible to determine the finding for remote PD only, however it is a reason to be cautious of the positive findings in the other five reviews.

What does the evidence say?

On the use of videos, five of six found that the use of video could enhance learning in PD. Video was most often used to review practice, either by viewing other professionals or watching back footage of a teacher's own classroom. One study specifically found that short video clips enhanced practitioner knowledge while increasing the time spent learning (Cook et al., 2010). One review (Kraft et al., 2018) finds teacher coaching programmes have a smaller benefit for pupil outcomes when video libraries are utilised, but this finding is not related only to remote PD.

Implications for PD in schools

Videos were often used in teacher PD to exemplify teaching practice or enable the teacher to reflect on their own actions in the classroom. Three reviews (Cho et al., 2020; Major & Watson, 2018; Marsh & Mitchell, 2014) emphasised the need to pair videos with other support: discussion with peers and experts or comprehensive learning aides. The positive findings relating to using video were found for synchronous and asynchronous PD, not for content professionals could use in an independent, self-directed manner, so PD providers would be advised to consider the purpose and use of video content before its creation.

3. Collaboration

Studies relating to collaboration emphasised the social aspect of learning between professionals. The collaborative approach could be taken with a peer, within a group or with a mentor.

Findings and implications

- Collaboration between colleagues may improve PD outcomes through enabling reflective practice and collective problem-solving
- Training may be required to ensure personal and professional boundaries are clear in the remote context
- Colleagues within the same setting may be able to enhance the benefits of remote or blended PD programmes by holding implementation workshops within their own setting

Relevant studies

Collaboration				
Review	School review?	Review focus	Number of studies	Reported impact
Barry et al., 2017	N	Review of communities of practice (CoPs) for occupational therapists, including a comparison with one online CoP	5 (2 remote)	Social context of learning appears to facilitate knowledge acquisition
Chan & Leung, 2018	N	Systematic review of use of social network sites among health professionals	33	Social networks can have benefits in a PD context but professionals require training in appropriate use
Gentry et al 2008	Y	Review of implementation of technologically-based mentoring and instructional coaching interventions for teachers	14	Collaborative style of mentoring supports better outcomes than acting as supervisory 'experts'
Hundey et al 2020	N	Review of teaching-focused online and blended mentoring programmes for higher education faculty	17	Online and blended mentorship have the potential to promote teaching knowledge and skills

Lynch et al. 2019	Y	Meta-analysis of STEM teacher PD including a comparison of PD with any online elements to face-to-face models on outcomes for students	95 (17 with online components)	Programmes that included troubleshooting and classroom implementation discussion were associated with higher student gains (but this finding includes face-to-face PD)
Major & Watson, 2018	Y	Review of use of video to support in-service teacher PD	82 (est. 32 remote)	Video viewing of classroom practice impacts teacher cognition but only when combined with high-quality support
Marsh & Mitchell 2014	Y	Review of the use of videos of classrooms in teacher PD	Unclear	Video viewing and discussion can potentially enhance teacher learning but is dependent on the interactions and reflections amongst learners

How secure is the evidence?

Seven reviews had findings relating to collaboration, but most had methodological weaknesses: five of the reviews were unclear in their methods for including studies and one mentioned the lack of objective measures of teacher knowledge gains as a drawback in the included literature. Although the included reviews correspond, all citing positive benefits of collaboration between colleagues, most of the studies did not meet our criteria for rigour in reporting standards, usually due to lack of clarity on their criteria for inclusion of studies in their analysis.

Only one review included outcomes relating to pupils or equivalent service beneficiaries and this review combined findings for online learning programmes with face-to-face PD (Lynch et al., 2019). Another review comparing remote and face-to-face communities of practice found the remote group gained fewer benefits than the comparison, though this finding relied on a single study and was not conducted with school staff (Barry et al., 2017). It is therefore difficult to distinguish whether collaboration has an impact on practitioner outcomes in remote PD or is merely common and well-regarded practice.

What does the evidence say?

Collaboration between colleagues is associated with practitioner knowledge gain (Barry et al., 2017; Chan & Leung, 2018; Hundey et al., 2020; Marsh & Mitchell, 2014) and improved pupil outcomes (Lynch et al., 2019) as well as distinctive benefits in enabling collective problem-solving (Lynch et al., 2019; Major & Watson, 2018; Marsh & Mitchell, 2014) and providing social professional connections (Barry et al., 2017; Chan & Leung, 2018).

Several different approaches to remote collaboration are explored in the literature, including peer collaboration (such as through social networking platforms and discussion forums) and collaboration with a mentor or coach via email, phone or online platforms (discussed in the section above). All appear to have the potential to support practitioner learning through self-reflection, though it should be noted the evidence is tentative. Evidence from one study suggests communities of practice have fewer benefits to participants' knowledge when delivered remotely, although they bring additional gains in connecting professionals at a greater geographical distance (Barry et al., 2017).

There were several findings relating to implementation in the literature:

- PD on secure and appropriate use of online forums and social media is a pre-requisite for their inclusion in PD (Chan & Leung, 2018; Gentry et al., 2008)
- Social media tended to be more highly valued by younger and less experienced staff, who were more likely to cite gaining professional connections as a benefit (Chan & Leung, 2018)
- Protected collaboration time should be provided by the school (Gentry et al., 2008; Hundey et al., 2020)

Implications for PD in schools

PD providers may choose to incorporate collaborative elements into PD for reasons other than improving teacher knowledge or pupil outcomes. Other benefits might include strengthening professional networks and ensuring teachers feel well-supported.

One review (Lynch et al., 2019) found that in-school collaboration supported better pupil outcomes (in a combination of face-to-face PD and PD with some online elements). Although the review does not suggest combining in-school collaboration with remote PD, if teachers are unable to attend face-to-face PD but can speak to colleagues in school, a blended approach combining remote PD with in-school collaboration may be a pragmatic solution for school leaders to try.

PD providers may wish to consider which remote elements of their PD require collaboration between whom and ensure the timing or structure of these elements allows all participants to attend, whether this is synchronous or asynchronous.

Supportive conditions

This section explores the conditions needed in the work environment to enable professionals to engage successfully with remote PD.

Findings and implications

- School leaders have a critical role to play in ensuring enabling conditions are provided for coaching and mentoring relationships to be successful
- Supportive conditions for successful PD include access to and training on appropriate technology; protected time to engage with sessions; clarifying the purpose of the relationship, roles and expectations

Relevant studies

Review	School review?	Review focus	Number of studies	Reported impact
Chan & Leung, 2018	N	Systematic review of use of social network sites among health professionals	33	Social networks can have benefits in a PD context but professionals require training in appropriate use
Gentry et al 2008	Y	Review of implementation of technologically based mentoring and instructional coaching interventions for teachers	14	Mentoring facilitated by technology has strong potential but requires adequate, user-friendly technology, time in workday for teachers to engage and supportive culture
Hundey et al 2020	N	Review of teaching-focused online and blended mentoring programmes for higher education faculty	17	Successful implementation of online and blended mentorship depends on dedicated human and material resources including support from senior administrators, alongside well-functioning technology
Marsh & Mitchell 2014	Y	Review of the use of videos of classrooms in teacher PD	Unclear	No clear conclusion on how learning environments should be constructed, but relevance and technical quality of the video is important in effectiveness of video-viewing to enhance PD

How secure is the evidence?

Four reviews explored implementation questions regarding the supportive conditions required for professionals to be able to engage successfully with their remote PD. Each review has a specific PD focus (social networks, coaching, mentoring and video use) so their findings may not generalise to all PD programmes.

We assessed the included reviews for quality. Three of the four reviews were rated as low quality, one (Gentry et al., 2008) medium quality, due to a lack of clarity regarding their inclusion criteria for studies or quality assessment of studies. Despite the low scoring, the included reviews provide a narrative discussion rather than making causal claims, so the findings can still be regarded as valid for consideration alongside professional judgement.

What does the evidence say?

The included reviews highlight several factors that may affect successful implementation:

- technology is available, of a reasonable quality and user-friendly (Gentry et al., 2008; Hundey et al., 2020; Marsh & Mitchell, 2014);
- professionals are adequately trained to use platforms required for the approach (Chan & Leung, 2018; Gentry et al., 2008);
- leadership teams support the PD, including by allowing time in work hours for the sessions to happen (Gentry et al., 2008; Hundey et al, 2020);
- Professionals have some flexibility about when and how PD takes place (Hundey et al., 2020);
- expectations of the sessions are clear, PD objectives are shared and remain the focus throughout the PD (Gentry et al., 2008; Hundey et al, 2020)

Implications for PD in schools

PD providers might be able to support professionals with some of these enabling conditions, but the weight of responsibility falls on school leaders and managers.

When commissioning external remote PD, particularly if this is a new approach, school leaders might find it useful to review the list above to ensure they have all the supportive conditions in place to enable the professional(s) to access the PD effectively. A conversation with the school leader or their presence at information-giving sessions may support external PD providers to ensure all professionals have appropriate enabling conditions met.

When designing internal PD, school leaders may wish to consider delaying implementation of this PD until barriers can be removed, such as adapting an individual teacher's heavy timetable or updating the school's computer operating systems.

For more guidance on implementing change in schools, see the EEF's **Guide to Implementation**.

Meta-analyses and systematic reviews included in the rapid evidence assessment

Author	Year	Title	Intervention type	Pooled effect (95% confidence interval)	Outcome
Barry, M; Kuijer-Siebelink, .; Nieuwenhuis, L; Scherpbier-de Haan, N	2017	Communities of practice: A means to support occupational therapists' continuing professional development. A literature review	Communities of Practice	N/A	Outcomes not defined
Basma, B; Savage, R	2018	Teacher Professional Development and Student Literacy Growth: A Systematic Review and Meta-Analysis	Video exemplars	0.225 ⁴ (0.064-0.385)	Student literacy
Chan, Windy SY; Leung, Angela YM	2018	Use of Social Network Sites for Communication Among Health Professionals: Systematic Review	Social media networking	N/A	Outcomes not defined
Cho, V; Cumings Mansfield, K; Claughton, J	2020	The past and future technology in classroom management and school discipline: A systematic review	Videos, interactive simulations, databases	N/A	Various, primarily teacher classroom management knowledge and skills
Cook, DA; Levinson AJ; Garside, S	2010	Time and learning efficiency in Internet-based learning: a systematic review and meta-analysis.	Internet-based learning	N/A	Time efficiency in Internet-based learning
Gentry, LB; Denton, CA; Kurz, T	2008	Technologically-based mentoring provided to teachers: A synthesis of the literature	Technology-based mentoring	N/A	Teacher attitudes, beliefs, practices; student achievement
Hines, S; Ramsbotham, J; Coyer, F	2016	The Effectiveness of interventions for improving the research literacy of nurses: a systematic review	Research literacy interventions	N/A	Research literacy
Hundey, B; Anstey, L; Cruickshank, H; Watson, GPL	2020	Mentoring faculty online: a literature review and recommendations for web-based programs	Online mentoring	N/A	Teaching confidence, knowledge and skills
Jackson CB; Quetsch LB; Brabson LA; Herschell AD	2018	Web-Based Training Methods for Behavioral Health Providers: A Systematic Review	Web based training methods	N/A	Practitioner knowledge and skill
Kraft, MA; Blazar, D; Hogan, D	2018	The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence	Teacher coaching	0.49 SD ⁵ (95% CI not reported)	Teacher instruction
Lynch, K; Hill, HC; Gonzalez KE; Pollard C	2019	Strengthening the Research Base That Informs STEM Instructional Improvement Efforts: A Meta-Analysis	STEM teacher development programmes	0.21 ⁶ (95% CI not reported)	Student achievement
Major, L; Watson, S	2018	Using Video to Support In-Service Teacher Professional Development: The State of the Field, Limitations and Possibilities	Video-based PD	N/A	Teacher cognition and classroom practice
Marsh, B; Mitchell, N	2014	The Role of Video in Teacher Professional Development	Video-based PD	N/A	Teacher professional knowledge
Peng, Y; Yan, W	2017	Effect of Internet-Based Learning in Public Health Training: An Exploratory Meta-Analysis	Internet-based learning	0.43 ⁷ (0.15, 0.72)	Professional knowledge
Semwal, M; Whiting, P; Bajpai R; Bajpai S; Kyaw BM; Tudor Car L	2019	Digital Education for Health Professions on Smoking Cessation Management: Systematic Review by the Digital Health Education Collaboration	Digital Education	N/A	Practitioner knowledge, skills, attitudes, and satisfaction
Singh T.; Reyes-Portillo J.A.	2020	Using Technology to Train Clinicians in Evidence-Based Treatment: A Systematic Review	Technology-based PD on evidence use	N/A	Clinician knowledge and skills
Tudor Car L; Soong A; Kyaw BM; Chua KL; Low-Beer N; Majeed A	2019	Health professions digital education on clinical practice guidelines: a systematic review by Digital Health Education collaboration.	Digital education on evidence use	N/A	Health professionals' knowledge, skills, attitudes, and satisfaction

⁴ Effect of PD on student literacy. Results for remote PD are not analysed separately.

⁵ Effect of all coaching on teacher instruction compared to no intervention (the estimated effect on student achievement is 0.18 SD). Their meta-regression estimates that virtual coaching reduces the pooled effect size on teacher instruction by -0.16 SD, compared to programmes without virtual coaching, however the author states: "We do not find any significant difference in effect sizes for coaching programs that were delivered in person or virtually, although our standard errors are too large to rule out even moderately sized differences".

⁶ This is the effect size for teacher PD programmes, compared to no intervention. The meta-regression estimates that PD with any online components reduces the pooled effect size by -0.16 SD, compared to programmes with no online components.

⁷ This is the effect size reported for professionals (separated from studies of students), compared to no intervention. The main effect size, combining student professionals) is 0.36 (-0.10,0.83).

Conclusion

1. Professional development can be supported effectively remotely

School professionals can gain knowledge and skills through remote PD, ultimately leading to gains in pupil outcomes.

Evidence is mixed as to whether remotely delivered PD is more or less effective than face-to-face PD, but specific benefits include lower costs and time incurred through travel. Other design principles are likely to be more important to PD outcomes than whether delivery is face-to-face or remote. There is no strong evidence that school-based PD should be delayed until it can be delivered face to face.

Blending synchronous and asynchronous delivery and blending face-to-face and remote learning may offer specific benefits by enabling trainees to feel part of a community while retaining travel cost savings, flexibility and social distance during remote and asynchronous elements.

2. Remote coaching, mentoring and expert support can be effective alone or as part of broader PD programmes

Coaching and mentoring can improve skills and knowledge of professionals when delivered remotely and may reduce feelings of isolation in professionals.

Remote or blended coaching, mentoring and expert support can be used to complement broader remote or blended PD programmes.

3. The use of video can enhance remote PD

The use of video is identified across a number of reviews as a particularly effective element of PD that enables teaching staff to review their own and reflect on others' actions in the classroom. The targeted use of videos generally increases the time trainees take to complete PD but is associated with gains in practitioner knowledge and pupil outcomes, suggesting the additional time might be spent engaging more closely with the content.

Video viewing is unlikely to be impactful in isolation and should instead be paired with other learning resources such as viewing guides or discussion with other professionals. One contradictory finding (though not limited to remote PD) suggests caution and monitoring is necessary when using video resources to support coaching conversations.

4. Interactive content and opportunities for collaboration hold promise for remote professional development

More interactive content tends to increase the time practitioners take to complete PD and is associated with better completion rates, knowledge and skill acquisition. Spaced education approaches (such as regular email surveys) could be particularly promising and may offer a low-cost way of enabling ongoing interaction with PD content. Conversely, barriers such as information being difficult to access can have a detrimental effect on user engagement.

Collaboration between colleagues may also improve PD outcomes through enabling reflective practice and collective problem-solving. For example, PD providers may include peer small-group discussion sessions following completion of individual tasks.

5. Remote professional development requires supportive school conditions (support from leaders, protected time, tech-specific training, platform ease of access)

School leaders have a critical role to play in ensuring enabling conditions are provided for remote PD to be successful. They can support staff to prioritise their PD by creating protected time within the working day for staff to engage with PD sessions or materials.

Schools should ensure staff have access to technology required for their PD and appropriate training in order to access this safely, efficiently and appropriately. PD outcomes are strengthened where the purpose of the PD, roles and expectations are clear; this may require co-ordination from the PD provider, trainee, and school leadership team.

The evidence in this review is drawn from diverse contexts that do not closely parallel the circumstances facing schools responding to Covid-19 in 2020. In all cases, it is important for teachers and school leaders to use their judgement in determining appropriate professional development approaches for staff.

Research questions

The systematic search retrieved 17 systematic reviews and meta-analyses.

1. **What evidence is available on the effectiveness of remote PD approaches, compared to face-to-face, blended approaches and other remote approaches?**

There is consistent evidence that remote PD can support improvement in professionals' knowledge and skills and in outcomes for pupils. This finding comes from reviews of school-based studies (n=4) and those from other fields (n=7). Of the eleven studies that directly compare remote learning to face-to-face or blended learning approaches, results are mixed as to which approach is more effective.

The evidence is spread across a wide range of different interventions and study designs. This review therefore does not attempt to measure the impact of remote or blended PD in comparison to face-to-face PD overall, but instead summarises the impact of different reviews and approaches thematically.

2. **Does some face-to-face contact moderate outcomes in remote PD approaches? How do different remote PD approaches moderate outcomes?**

The methodological limitations of this review of existing systematic reviews and meta-analyses means that it is not possible to systematically examine differential impacts of different approaches. There are several trends within the reviews in which research teams have highlighted particularly promising approaches, or conducted moderator analysis that indicate differential effects.

- Coaching, mentoring and expert support can be delivered remotely with evidence that skills and knowledge can be improved through these interventions delivered alone or as part of broader PD programmes
- Video use in remote PD is associated with increased reflective practice, knowledge gain and pupil outcomes when paired with discussion or learning resources
- Spaced learning approaches (such as regular email surveys of PD participants) may offer particular promise as a low-cost methodology which could enhance remote PD outcomes

3. **What can we learn from existing systematic reviews and meta-analyses about the characteristics of effective remote PD implementation?**

Evidence was mixed and inconclusive between synchronous, asynchronous or mixed instruction, with reviews identifying promise in each approach, although completion rates were likely to be lowest in fully asynchronous delivery.

There were several features identified across multiple reviews as supporting effective remote PD implementation:

- Supportive conditions for remote PD to take place included protecting time for the PD to take place and providing PD relating to the technology used in the intervention, including relating to professional behaviour online
- Opportunities to collaborate with colleagues was cited as promising in several reviews, though high quality evidence was lacking in this area
- There was strong evidence that engaging and interactive content supports knowledge gain in professionals, though the strongest evidence comes from outside the school context

Limitations

This review has been limited by a number of factors.

Umbrella review methodology

In order to complete this review quickly and to respond to schools' and school PD providers' need for evidence on remote PD, this review was limited to existing systematic reviews and meta-analyses. This means that we are unable to perform moderator analysis on specific types of remote PD and cannot apply quality criteria to individual studies. The limitations of this methodology mean that we have not provided an overall estimate of impact for remote PD, or for any of the specific approaches through which remote PD may be delivered.

Limitations in the evidence-base on remote PD

There were very few reviews included in the final report. From our background research, we concluded that we would need to use findings from across the world and from a wider field than just education in order to find enough evidence, and thus extended the criteria to include professionals in welfare and public health fields globally. While the rationale for including these professionals was sound, in reality it was difficult to categorise reviews, particularly into the included field of public health as opposed to the excluded field of healthcare, particularly as several reviews included studies working across both. Some included reviews could be characterised as serving healthcare professionals in public health roles.

Many of the reviews in the evidence base failed to find comparative evidence that related to knowledge gains, behaviour changes or other measures relating to professionals or relating to pupil outcomes (or equivalent service beneficiaries in other professions). Many reviews that included studies from relevant professions also included studies of pre-service professionals and these were usually greater in number. In these combined reviews, it was often unclear in moderator analysis how many studies from in-service professionals featured in the analysis or unclear whether there were differential effects between these two distinct groups. Other approaches, such as using video or simulation to support PD, were more prevalent among reviews of in-service professionals but did not always take place remotely.

Quality of review methods within education

One of the interesting findings of the review was the low quality of review methods amongst the retrieved studies. We rated the quality of each of the reviews using a number of criteria (the full rating system is available in the protocol [here](#)). Many of the studies did not apply a risk of bias assessment for the included studies. This meant that 7 of the 17 included reviews were rated as "low" in the quality assessment. While some reviews did explore methodological causes for heterogeneity – for example, sample size or type of measure – the fact that few reviews assessed the quality of the individual studies included in the reviews is a severe limitation to the quality of the reviews summarised in this rapid evidence assessment.

Future research

A technical write up of the rapid evidence assessment will be published in the future. Further research is recommended comparing face-to-face, online and blended delivery of the same PD programme for school professionals.

Additional resources

The Education Endowment Foundation has created a number of resources that are relevant to supporting learners during the Covid-19 outbreak. All resources can be found [here](#).

Some of the resources that directly relate to the findings of the remote professional development rapid evidence assessment are detailed below:

Resource	Description	Link
Remote learning rapid evidence assessment	Investigates methods that schools could use to support remote learning during school closures caused by the 2020 coronavirus pandemic (Covid-19), based on best available evidence.	https://educationendowmentfoundation.org.uk/public/files/Publications/Covid-19_Resources/Remote_learning_evidence_review/Remote_Learning_Rapid_Evidence_Assessment.pdf
Covid-19 resources	A range of online EEF resources to support schools to respond to the current challenges	https://educationendowmentfoundation.org.uk/covid-19-resources/
Attainment gap rapid evidence assessment	Examines the potential impact of school closures on the attainment gap, based on a systematic search of existing literature.	https://educationendowmentfoundation.org.uk/public/files/EEF_(2020)_-_Impact_of_School_Closures_on_the_Attainment_Gap.pdf
Guidance reports	EEF guidance reports provide clear and actionable recommendations for teachers on a range of high-priority issues based on the best available evidence.	https://educationendowmentfoundation.org.uk/tools/guidance-reports/
Teaching and Learning Toolkit	The Teaching and Learning Toolkit provides an accessible summary of the evidence across 35 different approaches aimed at improving pupil outcomes	https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/
Metacognition and self-regulation	Toolkit summary of metacognition and self-regulation approaches	https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/meta-cognition-and-self-regulation/
Digital technology	Toolkit summary of digital technology approaches	https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/digital-technology/
EEF funded evaluations	This is the full list of evaluations that have been funded by the EEF.	https://educationendowmentfoundation.org.uk/projects-and-evaluation/projects/
What Works Clearinghouse list of studies	A list of studies that examine the impact of remote learning approaches, identified by the What Works Clearinghouse	https://ies.ed.gov/ncee/wwc/distancelearningstudy

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Studies included in the review

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