What are the key pedagogic considerations for teaching and learning via distance?

This is not an exhaustive list but contains some considerations for how learning might be structured and sequenced to help learners through the 'blend', when a significant proportion of time will be spent learning from distance/at home.

All of the features selected below are features of effective teaching and learning. These considerations are particularly pertinent to formal or academic learning.

Pedagogic device	Why is this important in the blend?
1. Advance organisers 	Advance organisers allow pupils (and their parents) to see a high-level overview of what will be learnt during the sequence of learning or topic and how this links to prior learning. This idea was developed by the educational psychologist David Ausubel. An example of how to develop an advance organiser is shown in this brief clip below: https://ebtn.org.uk/big-picture-2/
2. Building on prior knowldege 	As with all effective teaching, planned sequences of learning should seek to build on prior knowledge. Whilst this can be picked-up up as part of the 'live' element of practice, it will be helpful to provide some prompts in the school's learning platform for pupils to refer to (perhaps as part of advance organiser). In this YouTube clip Dylan Wiliam assesses the importance of building on learners' prior knowledge https://youtu.be/TfzBkGI9VC8
3. Direct instruction 	In all subject/learning areas, as new content is being introduced it is important to ensure that pupils develop a secure understanding. Where pupils are engaging with instruction live or online, it would be helpful to provide access this taught element on the schools learning platform, in order that this can be revisited by pupils, as they develop their learning further. Learning intentions and success-criteria should be made explicit.

	This video capture from Tom Sherrington, provides a good introductory guide to Rosenshine's principles of effective instruction. https://bit.ly/3e2CUDV
4. Worked examples, clear modelling 	Modelling with 'teachers 'thinking aloud' as they demonstrate how to tackle a task is an important example of the cognitive support that learners' need' (Sherrington 2020). An additional strategy would be to add a 'completion problem', where learners have to solve a partly completed problem. As Sweller et al (2019) state "completion problems may be seen as a bridge between worked examples and conventional problems". Whilst this is an important feature of all teaching, it will become increasingly important where pupils are learning from a distance. A clip recorded on the learning platform for pupils to play 'on demand', for example will be helpful. The video below explains how to create a video clip https://bit.ly/31nZm6H
5. Scaffolding of tasks 	Checklists, writing frames and anticipating errors and misconceptions will be essential features of well-planned distance learning.
6. Provide opportunities for learners to practice and master content before being asked to solve problems or enquire. 	Cognitive load theory was described by Dylan Wiliam as the 'single most important things that teachers should know' (Kirschner and Hendrick, 2020). This theory is based on the limited ability of the working memory to code information. As we can only deal with up to '7 items' in our short term memory on any one occasion, we need to be able to draw on our long-term memory to support us with problem solving. That means that we must have 'mastery' of the knowledge and skills required before being asked to solve a problem. With increasing knowledge practice at solving problems becomes increasingly important rather than having negative effects on learning.

7. Opportunities to support AfL / reflection / feedback 	We know that providing opportunities for learners to check and reflect upon their understanding of work/tasks and providing timely feedback to move their learning forward are crucial. This is often achieved through verbal feedback or peer assessment in a classroom setting. **How can this be achieved when they are working online?** We often know where key misconceptions are likely to occur within subject areas, one way that we could pre-empt this is by providing some diagnostic questions to check on our learners understanding. In this blog Daisy Christadoulou reflects on the use of multiple-choice questions to identify learner misconceptions. https://bit.ly/3hmupp4
8. Provide opportunities for peer interactions 	Evidence summarised above from the EEF suggests that in order to support learner progress in learning and support their wellbeing through the blend, we need to provide opportunities for learners to complete peer marking and feedback. Success will be dependent on two things: 1. Ensuring that learners clearly understand the success criteria for the task and how this relates to the method by which they are being assessed 2. Utilising a digital platform / technology that allows for these types of interaction to take place. A good example is Jamboard on Google classroom.
9. Weekly and monthly review (retrieval practice / practice testing) 	The idea/concept here is a simple one. Providing periodic opportunities for learners to review their learning will help them to retain knowledge in the long term and reduce the rate of 'forgetting'. It also helps learners to make connections to new or prior knowledge if completed in an appropriately sequenced way. This is important where learners are learning new knowledge and skills. As (Bjork and Bjork 2014) state "although massing practice (for example, cramming for exams) supports short-term performance, spacing practice (for example, distributing presentations, study attempts, or training trials) supports long-term retention" It is also important to elicit whether or not learners have developed a deeper understanding of the material being learned. Where this learning is superficial, learners may be able to 'recall' facts from the learning, but they may not be able to 'transfer' this learning to a similar, but different scenario. This YouTube clip provides a good summary of the difference between recall and transfer **https://tinyurl.com/ycwut4wl** In the blend, this could be facilitated through creating a self-marking quiz, the following video explains how to do this in Google forms: https://bit.ly/31nZm6H This review by the Education Endowment Foundation (EEF), provides a more in depth look at the benefits and potential challenges presented by retrieval practice. https://bit.ly/2YCjrTP

10. Using enquiry 	Once pupils know enough in a subject area or topic, the blend offers opportunities to support enquiry. Google classroom and OneNote also provide opportunities to support collaborative enquiry. It's important to provide some scaffolds to support learners. Tom Sherrington (2020) provides the following helpful guidance to ensure that pupils have a greater chance of success with enquiries: 1. Establish the enquiry question (provide learners with examples / models of good enquiry questions and a sense of range of knowledge or skills to cover) 2. Teach the enquiry skills needed in advance (what maths skills, geographical skills or online research skills will pupils need?). 3. What scaffolds / resources do pupils' need to support them (deadlines are important too)? 4. Monitor and provide interim feedback. Collaborative online technologies like those found in Gsuite and MS365 provide great opportunities for teachers to provide real-time and personalised feedback to learners /groups during enquiry. 5. Showcase the results. It's important that learners get the opportunity to share their learning, which will help them to deepen their understanding.
11. Underpinned by (domain specific) explicitly taught self-regulation strategies 	Self-regulation strategies have one of the biggest impacts on supporting progress in learning, however, it is essential that learners have sufficient knowledge and understanding in the area in which they are studying to be able to do this effectively. This useful article from the EEF looks at metacognition and self-regulation in greater depth, with practical suggestions for how these can be introduced into practice. https://bit.ly/2UOpzqX

...and what should we try to avoid?

Where we are utilising technology to support the blend, there may be a temptation to provide opportunities for more open-ended, research focussed tasks, discovery learning or problem-solving tasks that utilise technology. If we are thinking about providing these types of activities, it is important to recognise what the science says.

The explanations below are provided by Paul A Kirschsner and Carl Hendrick in their book – *How Learning Happens: Seminal Works in Educational Psychology and What They Mean in Practice, Routledge 2020.*

1. **Children are digital natives and think differently from previous generations.** Kirchsner and Hendrick conclude with a summary of the available evidence that "there is no evidence that young people today have any special skills that would allow them to learn differently".

2. **With Google, knowledge is no longer important.** An important observation here is that "there is no knowledge on the internet, only information". Without a solid knowledge base, we can do little with what we find on the internet, or as E.D. Hirsch puts it 'Google rewards the cognitive insider'. What we read, see and understand is determined by what we already know. Therefore, if we're asking our learners to use the internet to support their research, it's important they already know enough about what we've ask them to find out, otherwise they won't be able think critically and discern between useful and unhelpful information.

3. **You learn to solve problems by solving problems.** To solve problems, we must first have the knowledge and skills in which we must solve that problem. Without domain specific and procedural knowledge (how to perform a task), problem-solving becomes and exercise in trial and error! As Bjork and Bjork (2014) state "the trials and errors of everyday living and learning do not seem to result in the development of an accurate mental model of the self as learner or an appreciation of the activities that do and do not foster learning."

4. **Discovery learning is the best way to learn.** The science suggests that if learners have no prior knowledge of the domain/area in which they are working, they will have no systematic approach to finding it. Learners would therefore use a significant amount of their working memory trying to decipher the information they are finding. This load on the working memory doesn't result in more knowledge in long-term memory as it was used to discover and not learn.

Other Design Considerations

The following design considerations are drawn from the work of Sweller et al (2019), based around cognitive load theory.
This theory asserts that there are three elements that contribute to 'cognitive load':
Intrinsic load – A measure of how many new things a learner has to do to complete a task (we can cope with between 3 – 7 items (and the interactions between them) at one time.
Extraneous load – A measure of the load of the task that doesn't support learning (we should try to reduce this where possible) e.g. unnecessary anecdotes, complicated vocabulary, flashy animation, background music could all increase extraneous load!
Germane load – A measure of the extra load required to integrate the new learning into existing knowledge (the work of learning). We can support the learning process by providing appropriate scaffolds and prompts, which can be reduced as learners master knowledge and skills.

Examples of how to reduce the extraneous load on our learners.

In order to...	We should...
Reduce the 'split attention' effect - (when learners are confronted with two complementary sources of information, which cannot stand on their own but must be integrated before they can be understood.)	Ensure that where we are providing an animation/diagram with some narration, these should be provided at the same time (not separately) in order to decrease cognitive load and facilitate learning.
Avoid the 'redundancy' effect This occurs when the two sources of information are self-contained and can be understood without reference to each other.	If we are presenting a diagram with supporting text that summarises the same information (for example) only presenting the diagram would reduce cognitive load.
Present information to maximise learning (modality and isolating elements). Effective working memory capacity can be increased by using both visual and auditory working memory rather than either 'processor' alone.	Replace a written explanatory text and another source of visual information (e.g. diagram) with spoken text and the visual source of information.

Mayer's Principles of Multi-media learning

Building on the work of Sweller et al, Prof Richard Mayer (2001) built 12 principles that should be applied when developing multimedia materials. Teachers developing digital materials should consider these as a useful checklist to maximise learning and reduce potential barriers in the development of their instructional materials. This works both online and in the classroom!

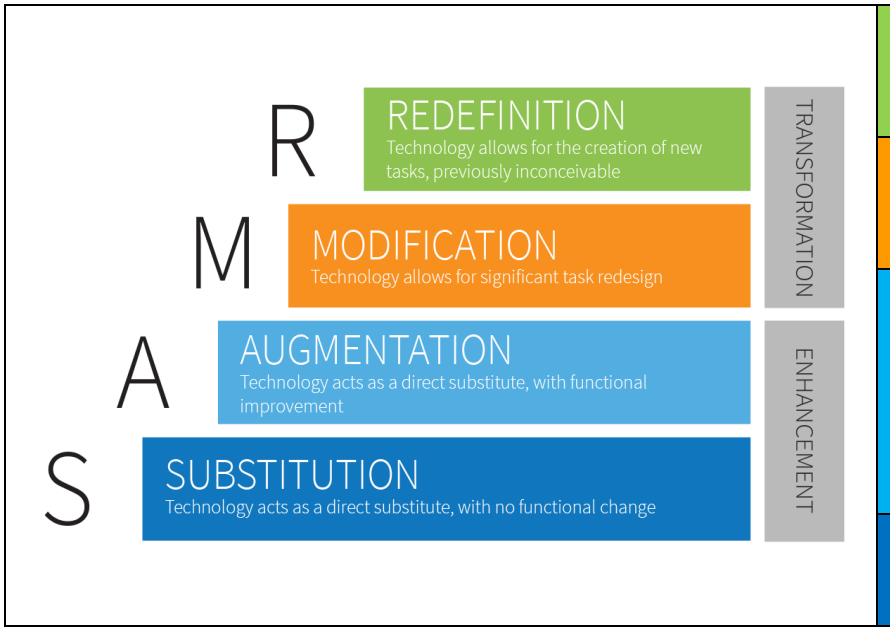
Principle?	What does this mean for the design of learning materials?
Coherence Principle	People learn better when extraneous (extra materials that are not required) words, pictures and sounds are excluded rather than included.
Signalling Principle	People learn better when cues that highlight the organisation of key material is added. For example, highlighting key words / phrases.
Redundancy Principle	People learn better from graphics and narration than from graphics, narration and on-screen text.
Spatial Contiguity Principle	People learn better when corresponding words and pictures are presented near rather than far from each other on the page or screen.
Temporal Contiguity Principle	People learn better when corresponding words and pictures are presented simultaneously rather than successively – therefore on the same slide / document.
Segmenting Principle	People learn better from an online lesson, when it is presented in user-paced segments rather than as a continuous unit. It is important to chunk material, therefore, not present everything in one resource.
Pre-training Principle	People learn better from a multimedia lesson when they know the names and characteristics of the main concepts. This links to the idea of 'advance organisers' set out above – it allows learners to add knowledge to existing schema and build on prior knowledge.
Modality Principle	People learn better from graphics and narrations than from animation and on-screen text. This approach takes advantage of both the auditory and visual channels, which can work in tandem.
Multimedia Principle	People learn better from words and pictures than from words alone.
Personalisation Principle	People learn better from online lessons when words are in conversational style rather than formal style – as might be experienced in the classroom.
Voice Principle	People learn better when the narration in online lessons is spoken in a human voice rather than a 'machine' voice.
Image Principle	People do not necessarily learn better from an online lesson when the speaker's image is added to the screen.

https://ctl.wiley.com/principles-of-multimedia-learning/

The following YouTube clip provides a clear explanation of Mayer's principles:
https://www.youtube.com/watch?v=1fEC5rFCATw

SAMR Model

The SAMR model shown below helps us to reconsider how we use digital technologies to support teaching and learning. It's likely that much of the distance learning provided to date has been a simple case of technology being used as a 'substitute' for traditional classroom activities, however, as time progresses (and provided that we think about the pedagogical considerations above, technology has the potential to enhance our practice). Consider the below:



For example, collaborative technologies e.g. Google docs / One note allow learners to co-construct digital artefacts through (well-structured) approaches to enquiry.
The 'flipped classroom', where learners complete some independent tasks ahead of in-class learning is an example of how technology can provide ways to modify learning design.
Providing instructional materials (e.g. a talking head) that pupils are able to re-visit, e.g. by pausing and re-visiting aspects of learning. Providing quizzing activities e.g. well thought out multiple choice questions to elicit learner misconceptions ahead of a unit of learning are examples of where technology can 'augment' traditional approaches
For example, using Google Classroom as a repository to store worksheets or present tasks as you would in the classroom.

References:

Bjork and Bjork (2014), Making things hard on yourself, but in a good way: Creating desirable difficulties to enhance learning, Psychology and the real world.
Kirschner P. A and Hendrick C (2020) How Learning Happens (Routledge)
Sherrington T (2019), Rosenshine's Principles in Action (John Catt)
Sherrington T and Caviglioli O (2020), Teaching Walkthrus (John Catt)
Sweller P, van Merriënboer J. G and Paas F (2019) Cognitive Architecture and Instructional Design: 20 Years Later (Educational Psychology Review)