Sandringham School

Seven Research Informed Pedagogies for Remote Learning

Sandringham EdTech Demonstrator School

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About Sandringham 'EdTech Demonstrator' School

Sandringham School is a co-educational state comprehensive secondary school of over 1500 students, based in St. Albans, Hertfordshire. Sandringham is a highly attaining school, regularly within the top 100 non-selective state mixed schools nationally in terms of progress.

We introduced a programme called Blended Learning in 2014 that includes a BYOD programme for every student with a learning platform built upon Google GSuite for Education. Our learning goals are summarised by the phrase 'time-shifted and place-shifted learning.' Students in Key Stage 3 and 4 use tablet devices and Key Stage 5 use laptops delivered in a phased approach over several years. Equity of access for all is ensured by use of pupil premium funding.

We have developed significant expertise in digital pedagogy and deliver training via our Teaching and Research School networks. Our practices are evidence-informed and use guidance from the EEF and other expert sources. Subject leaders have had considerable autonomy in steering the programme, unearthing the best tools and teaching practices that suit their subject, and in the forming the right blend between analogue and digital.

More about our journey can be found in the January 2019 edition of Chartered College Impact Magazine : https://bit.ly/SandringhamImpact

Our recent transition to remote learning has been reasonably straightforward in that all students have digital platform access. Staff and students have experience of using the main toolsets as a matter of routine. There have been challenges (e.g. video conference 'live' lessons) but parental feedback on the model has been very positive.

In April 2020, we were designated by the Department for Education as an 'EdTech Demonstrator School', with a role to support other schools with their EdTech strategy and remote learning amidst the school closures that resulted from the COVID-19 pandemic.

These Guides

The guides contained within this document are designed to align research-informed pedagogies with remote-learning practices. We understand that all schools will have a different context and demographic, meaning that not all of these approaches will be possible for every school. For further advice and guidance you can visit the national EdTech demonstrator portal at edtech-demonstrator.lgfl.net and also view more resources from Sandringham School at www.sandagogy.co.uk/edtech.

These guides were created by Caroline Creaby, Fergal Moane, Christian Turton, Karen Roskilly, Kate Mouncey and Katie Wills.

Feedback

Research informed pedagogies for remote learning

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What is feedback?

Feedback is information given to a student about their performance which aims to bring about improvements in their learning. There are four types of feedback[1]: feedback about a specific task, the process of the activity, management of a student's learning (metacognition) and about them as individuals (least effective). Feedback can be written or verbal.

What does the research say about feedback?

The evidence suggests that, done well, feedback can have a very high impact on learning[2]. In order to be effective it needs to give a clear indication of what the student needs to do next and focus on clear strategies for improvement. Targets need to be clear and actionable. Feedback should cause thinking[3] and time should be given to enable students to consider and respond to it appropriately[4]. Awarding grades can reduce the impact of feedback[5] and lengthy feedback can dilute the message and lead to students being overwhelmed. Feedback provided by peers, when focused on improvement rather than evaluation, can be a very powerful tool.[6]

What does feedback look like with remote learning technology?

- Attaching written comments on digital documents using the comment feature.
- Annotating a document that's been handed in using the Google Classroom mobile app note tool, the built-in markup feature on iPad or the Kami online app.
- Adding recorded voice notes to handed in work using the voice recording feature in apps like Kami, SeeSaw, Showbie, or Apple Schoolwork.
- Recording a screencast whilst annotating feedback using screen recording apps like Loom, Screencastify, built-in screen recording on iPad, or an app like Explain Everything.

Further reading links

Wiliam, D. (2011). Embedded Assessment. Bloomington: Solution Tree Press.

Hattie.J. & Timperley, H (2007). The Power of Feedback. Review of Educational Research, 77(I), 81-112

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[1] Hattie and Timperley (2007)

[2] EEF Teaching and Learning Toolkit https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/feedback/

[3] Wiliam (2011)

[4] Elliott et al., (2016)

[5] Butler (1988)

[6] Wiliam (2011)

What is formative assessment

Formative assessment is the process whereby a teacher uses information about students' understanding to make adjustments to their teaching as they go. This process should therefore improve the effectiveness of teaching and learning. Teachers will commonly use discussions, questions and activities to elicit students' understanding. Alongside using this information to adjust their teaching, teachers can use this to feed back to students and peers, harnessing their roles in the learning process.

What does the research say about formative assessment?

Designing well-chosen questions and tasks will identify where students have successfully understood new information or where they are developing misconceptions. Assessing all students' understanding through a time efficient hinge question [7] for example, rather than just asking few students builds a more valid picture of understanding. Feedback to students should ideally be task and not ego based[8]. Enabling students to act on teacher feedback[9] and engage in self or peer assessment can be highly beneficial.

What does formative assessment look like with remote learning technology?

Effective tools are those that enable a teacher to gauge understanding of their whole class.

For example:

- Asking students to type an answer into the chat window in a video conferencing platform (Google Meet / Microsoft Teams) and asking all students to send at the same time (to avoid copying).
- Use of quizzing tools to assess understanding or pose hinge questions through multiple choice questioning (eg. Kahoot, Quizziz, Nearpod, Google Forms Quizes,) - see this guide from Dylan William and Siobhan Leahy on diagnostic questions.
- Posing the student a task to explain a concept using a whiteboarding tool that also records voice such as Explain Everything, ShowMe or EduCreations, built-in screen recording and Notes app for drawing on iPad or the record feature in SeeSaw.

Further reading links

Diagnostic questioning tips from Dylan William and Siobhan Leahy

Wiliam, D. (2011) Embedded Formative Assessment. Bloomington: Solution Tree Press.
Fletcher Wood, H. (2018) Responsive Teaching. London: David Fulton.

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[7] Wiliam, 2015

[8] Kluger and DeNisi, 1996

[9] EEF Teaching and Learning Toolkit: Feedback

What is retrieval practice?

Retrieval practice is the process of bringing to mind information from memory. This often takes the form of regular low-stakes testing or quizzing but also takes other forms such as producing mind-maps from memory, writing everything you know about a topic, self-testing with flash cards or explaining a complex concept.

What does the research say about retrieval practice?

Research shows that the more we practice remembering information, the more likely it is we can transfer information to our long term memory. Retrieval practice is a highly effective study strategy, more so than simply reading notes for example[10]. When quizzing, it is important to change the wording of questions so that students don't just learn how to answer a particular question[11]. There is also strong evidence that spacing retrieval is effective [12] and the interleaving of topics within subjects can be useful when introduced carefully.

What does retrieval practice look like with remote learning technology?

Effective tools are those that enable a teacher to gauge understanding of their whole class.

For example:

- Running regular multiple choice 'auto-marking' quizzes using tools such as Socrative, Kahoot or Quizzizz whilst video conferencing, then reviewing the answers as a class.
- Setting self-study quizzing using tools like Quizlet (with adaptive testing), Nearpod (paid version required) or Quizzizz.
- Using shared board tools like Padlet or a shared live document (eg with Google Slides) to ask students to recall information on a topic and then arrange and connect that information.

Further reading links

"Optimising Learning Using Retrieval Practice" - a blog by The Learning Scientists.

Study: Retrieval-based learning: The need for guided retrieval in elementary school children.

Study: Retrieval practice in primary science lessons.

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[10] Dunlosky, J. (2013). Strengthening the student toolbox: study strategies to boost learning. American Educator, 37(3), 12–21

[11] Trumbo, M. C., Leiting, K. A., McDaniel, M. A., & Hodge, G. K. (2016). Effects of reinforcement on test-enhanced learning in a large, diverse introductory college psychology course. Journal of Experimental Psychology: Applied.

[12] Kapler I, Weston T and Wiseheart M (2015) Spacing in a simulated undergraduate classroom: Long-term benefits for factual and higher-level learning. Learning and Instruction

What is self-regulated learning?

Metacognition and self-regulation approaches aim to help students think about their own learning more explicitly, often by teaching them specific strategies for planning, monitoring and evaluating their learning. Self-regulated learning can be broken into three essential components:

- cognition - the mental process involved in knowing, understanding, and learning;
- metacognition - often defined as 'learning to learn'; and
- motivation - willingness to engage our metacognitive and cognitive skills.[13]

What does the research say about self-regulated learning?

Metacognition and self-regulation approaches have consistently high levels of impact, however teaching these skills remotely is challenging. Prompting students to reflect on their work or to consider the strategies they will use if they get stuck have been highlighted as valuable. Wider evidence related to metacognition and self-regulation suggests that disadvantaged students are likely to particularly benefit from explicit support to help them work independently, for example, by providing checklists or daily plans.[14]

Keeping motivation high for students learning remotely includes sustaining a sense of a learning community (e.g. some synchronous lessons or collaborative tasks) and establishing expectations and social norms around remote learning.

What does self-regulated learning look like with remote learning technology?

- Provide clear communication and support for parents (school website, LMS such as Google Classroom, homework diary such as Show My Homework).
- Signpost students to platforms where they can be supported through learning episodes e.g. BBC Bitesize Daily, Oak National Academy, Khan Academy, FutureLearn.
- Encourage students to test themselves through scaffolded retrieval practice where tools such as Quizlet, Seneca Learning and StudyBlue are useful.

Further reading links

EEF, Supporting Parents with remote learning

Harry Fletcher-Wood: Motivating students to learn remotely, seven key ideas

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[13] EEF Toolkit: Metacognition and self-regulation https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/meta-cognition-and-self-regulation/

[14] EEF Rapid Evidence Assessment on Remote Learning https://educationendowmentfoundation.org.uk/covid-19-resources/best-evidence-on-supporting-students-to-learn-remotely/

What is 'dual coding'?

Dual coding is an aspect of cognitive science which suggests that using diagrams alongside text can help learners build schemas and connections to link knowledge and ideas. Images, if chosen correctly, can help learners to rapidly understand meaning and then enable them to think more critically about a concept.

What does the research say about 'dual coding'?

First identified by Allan Pavio (1971), the concept proposes that diagrams can help in the understanding of meaning by illustrating and visually structuring knowledge. Providing information in both visual and verbal form can clarify ideas and best use of our working memory. This can reduce the cognitive load required to help knowledge to stick, and can then help learners progress into higher order thinking at a quicker pace. The visual images used must be meaningful and thought through carefully to avoid complication and overload.

What does 'dual coding' look like with remote learning technology?

Producing videos and presentations with voice recording and visuals that are directly related to the learning topic. Where appropriate, text should be aligned to the image or diagram, rather than placed separately in a key. Any extraneous animation and visuals should be avoided as they will lead to a higher cognitive load. Effective dual coding can be done in a variety of ways depending on the content but could include:

- Adding voice recording to a Powerpoint or Keynote presentation.
- Recording a screencast of a presentation using tools like Loom or iPad screen recording.
- Drawing whilst explaining using a visualiser, a whiteboard recording app such as as Explain Everything, ShowMe, EduCreations, or on iPad, built-in screen recording and Notes app for drawing or the record feature in SeeSaw.

Further reading links

An introduction to Dual Coding theory from Futurelearn and the Chartered College of Teaching.

Website with links to lots of resources about dual coding by Oliver Caviglioli

A detailed blog by the Learning Scientists about the difference between dual coding and 'learning styles'

Cognitive Load Theory

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What is cognitive load theory?

Cognitive Load Theory is based on the idea that our working memory can only hold a limited amount of information for a limited time. The retention of information in long-term memory can transform our ability to learn as this overcomes the limits of our working memory. Via instructional design, we can avoid overloading working memory and improve learning.

What does the research say about cognitive load theory?

Sweller's theory[15] identifies three different forms of cognitive load:

- Intrinsic cognitive load: the inherent difficulty of the material itself, which can be influenced by prior knowledge of the topic
- Extraneous cognitive load: the load generated by the way the material is presented and which does not aid learning
- Germane cognitive load: the elements that aid information processing and contribute to the development of 'schemas'

CLT suggests that if the cognitive load exceeds our processing capacity, we will struggle to complete the activity successfully.

What are the considerations around cognitive load when using technology?

- Ensure that presentations are clear of extraneous detail.
- Where possible when creating diagrams, ensure that the text is included on the diagram rather than having a separate key.
- Chunk information throughout the lesson time in logical steps, especially when working remotely.
- Use scheduled assignments to deliver information in steps and allow extra consolidation time when working remotely.
- Encourage students to have shorter spaces of focused time away from distractions spaced throughout the day.
- Consider worked examples and completion problems.
- 'Goal-free' questions can reduce cognitive effort.

Further reading links

Cognitive Load Theory and It's application in the classroom, Chartered College of Teaching

Cognitive Load Theory, what does the research say

https://bit.ly/CLTExplained

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[15] Chandler, Paul and Sweller, John: Cognitive Load Theory and the Format of Instruction, Cognition and Instruction: 8(4) 1991, 293-332. http://ro.uow.edu.au/edupapers/128

Collaborative Learning

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What is collaborative learning?

A collaborative (or cooperative) learning approach involves students working together on a learning task in a group small enough for everyone to participate fully in a way that has been clearly assigned. Students in the group may work on separate tasks contributing to a common overall outcome, or work together on a shared task.[16]

The use of computer and digital technologies is usually more productive when it supports collaboration and interaction, particularly collaborative use by learners or when teachers use it to support discussion, interaction and feedback. [17]

What does the research say about collaborative learning?

The impact of collaborative approaches on learning is consistently positive. However, the size of impact varies, so it is important to get the detail right. Effective collaborative learning requires much more than just asking students to work in a group; structured approaches with well-designed tasks lead to the greatest learning gains. There is some evidence that collaboration can be supported with competition between groups, but this is not always necessary, and can lead to learners focusing on the competition rather than the learning it aims to support. Approaches which promote interaction between learners tend to result in the best gains.

What does collaborative learning look like with remote learning technology?

- Students working together in groups on shared documents (Google Docs, Microsoft 365 or collaborative Apple documents and using comment features.
- Students working together or supporting each other on shared walls eg. Padlet, Jamboard, Explain Everything Collaborative, Classkick.
- Collaborative workspaces, e.g. group shared folders or discussion boards.
- Creative tasks involving co-construction e.g. BookCreator, Storyboard That.

Further reading links

NESTA, Decoding Learning, 2012

EEF Toolkit Strand on Collaborative Learning

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[16] EEF Toolkit : Collaborative learning

[17] EEF Impact of Digital Technology, 2012