THE CENTER *for* TRANSFORMATIVE
TEACHING & LEARNING™
AT ST. ANDREW'S EPISCOPAL SCHOOL

A Science of Learning Guide to Education Technology

Mapping *EdTech* products to teaching needs

neuroteach global

A Note About the Genesis of this Guide

This Science of Learning Guide to Education Technology was created by everyday classroom teachers in an everyday school. It was designed to help teachers use education technology in the most effective way possible. It does this by mapping EdTech tools onto the most promising research in how the student brain learns, works, changes, and thrives.

This guide was created by St. Andrew's preschool through Grade 12 faculty during the COVID-19 pandemic, when teachers around the world were forced to make school happen at a distance. It is built on our more than a decade of experience using the best research that exists to support the social, emotional, and academic growth of all children. As a result, this guide brings together EdTech, the science of teaching and learning, and the lived experience of expert teachers – all in service of the whole-child school experience.

This guide is one of many professional development solutions created by The Center for Transformative Teaching & Learning (CTTL) at St. Andrew's. It is included as a supplemental resource in the Distance Learning track on the CTTL's online professional development platform, Neuroteach Global.

The Distance Learning track is a bundle of existing micro-courses that are most supportive of distance teaching and learning. Together, these micro-courses offer eight hours of professional learning to help you consider how the best research in belonging, memory, metacognition, motivation, mindset, feedback, and social and emotional learning can inform how you challenge and support students. For more information on Neuroteach Global, visit https://neuroteach.us.

We hope this guide, and Neuroteach Global, help you on your teaching journey.

The CTTL Team

How to use this Guide

We want to build usable, durable, flexible knowledge. The science of learning suggests that to do this takes 3 steps. In order, they are: encoding, storage and retrieval. Unlike most EdTech guides, we have organized ours by what tools are best for the step that you are on.

Begin by finding which step you want to work on, then use this guide to find a tool to help.

Want more research informed professional development? Visit thecttl.org
or try our online microcourses: neuroteachglobal

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GOOD PRACTICES

General practices that support distance learning

Communicate your expectations (for classwork, projects, behavior, etc.) clearly and directly

Maintain consistent routines/procedures so students know how to navigate your course (e.g. how to see what work is due when, how to submit work, etc.). Be consistent in how you word instructions

Ensure that all instructions are extremely comprehensible and accessible

Help students stay at the right level of stress (not too much, not too little)

Reduce the chunk size of new content since distance learning increases cognitive load demands

Impress on your students the importance of eliminating distractions

Balance on-screen and off-screen tasks to reduce screen time. Reducing on-screen time can increase engagement and on-task behavior.

Check for understanding more frequently than during in-person class

Be more explicit about linking the current lesson to prior knowledge, skills and lessons

Provide more concrete examples; give them up front – particularly when introducing abstract concepts

Be as prompt as possible in entering grades as this reduces anxiety. Offer opportunities for revision where appropriate, as it may be harder for students to produce their best work in a new learning environment. Even though it is now harder to tell, judge when to be graceful and when to be firm

Provide more structure for executive functioning tasks (eg. planning, monitoring progress through a project, ensuring work is submitted correctly, providing rubrics when appropriate)

BELONGING

Creating a sense of belonging and helping students feel "seen" in the digital classroom

Start classes by checking in on all students (e.g. verbal check-in, visual check-in, online poll with Mentimeter or Poll Everywhere)

Provide space for students to talk about their emotional state (stress, anxiety, distractions), such as free-writing, free-drawing, or a brief class discussion, when it's needed

Recognize not everyone will be comfortable sharing themselves/their homes on video and be supportive of this. Give them alternative ways of showing focus and attention, such as chat interaction, poll responses, etc.

Let students know your availability outside of class time for individual conversations about things they may not want to share in front of the group

Create a safe space (e.g. Google Chat, email) for students to reach out to you during instruction/class activities with questions, concerns, or information (e.g. I'm not feeling well) they might not want to share publicly

Put students' health and well-being first, and be flexible with your hopes and expectations for distance learning

ENCODING: taking in new content	
Building Engagement	
Start of class	
WEBSITE OR APP	NOTES & TIPS
Youtube and Vimeo videos	Show a brief content-related video to build interest (i.e. it introduces a topic for debate, inspires students to ask questions, draws on previous knowledge, connects classroom content to real-world context)
A polling tool (eg. Poll Everywhere) or interactive presentation tool (Pear Deck, Nearpod) of your choice	True/false or multiple choice questions, or a prompt to write a short response to. Use to both spark interest and surface misconceptions. Or use "agree/disagree" to spark discussion
Engagement "Scooby Snacks" for mid-class emergencies	
skribbl.io	A virtual pictionary game that you can play with random words (good for advisory) or populate with your own word list (good for vocabulary review in class). Maximum of 8 players, but you can run multiple sessions simultaneously for larger classes.
Kahoot	Some study games like Kahoot can be used as an engagement scooby snack; there are a plethora of Kahoot quizzes created by others that can be played as a fun break, to build community, or boost morale (holiday-themed, random trivia, etc.)
Jackbox (not free)	Games like Drawful and Quiplash are great for advisories, maximum of 8 players but some games allow audience participation as well. Quiplash 2 allows you to supply your own prompts which could make it subject-focused
Sporcle	A website full of quizzes and trivia games that can be played together against a timer.
Designing for engagement when we create projects and activities	
Apple Books (formerly iBooks)	Students can create their own books to practice skills (e.g. Latin composition) or share their understanding (e.g. a guide to mitosis); these can also be shared with classmates as a resource for learning
iMovie/QuickTime Player + Class YouTube Channel	Students can create videos to share their understanding (e.g. the rock cycle); these can be shared with classmates to use for review
Online Comic Strips (Pixton, MakeBeliefsComix, StoryboardThat)	Students can write and illustrate comics to practice skills and share their understanding (e.g. a day in the life of a Roman woman); these can be published into one comic book that the whole class reads

ThingLink	This online program allows students to upload and annotate an image with text, video, links, and additional images. When complete, they can be shared with the class for students to learn/explore on their own.
Glogster	A plethora of free, pre-created templates that students can use to create quick and easy digital posters
Animoto	A plethora of free, pre-created templates that students can use to create quick and easy videos with text, images, and audio.
Canva	A plethora of free, pre-created templates for all types of media
Google Sites	Students can easily build a site that displays their information and allows exploration of a topic.

Delivering content

Making videos and narrated lectures of lessons to post	
Loom	Can embed a webcam video of your face in the screencast which is good for relational connection - circular and less obtrusive
Screencastify	Can embed a webcam video of your face in the screencast which is good for relational connection - square and more obtrusive
Quicktime	Can embed a webcam video of your face in the screencast which is good for relational connection - square and more obtrusive
OpenBoard	A whiteboard app with a built in screencasting function that has a large range of functionality with embedded media and applications.
Educreations, ShowMe	Great and simple iPad apps for making videos
doceri	Screencast recorder, whiteboard and presenting tool for iPad
Making interactive lessons	
Pear Deck	Teachers can design interactive Google Slides for students to show understanding (multiple choice questions, short written responses, identification) and share their thinking with each other, with anonymous results. Can also create self-paced lessons. There are many user submitted lessons that you can start with and adapt.
Nearpod	Similar to Pear Deck but less native to Google Slides. Includes Augmented Reality and other kinds of content. There are many user submitted lessons that you can start with and adapt.

VoiceThread "Conversations in the Cloud"	Teachers create an interactive presentation (with images or slides), which students can view and respond to (recording or writing) when prompted. Excellent for highly visual lessons and for having students respond to one another.
Tools to work with videos that already exist (to create engagement & check understanding)	
EdPuzzle	Can embed questions and feedback in videos (any YouTube video or a screencast lesson that you create). Helps with engagement, accountability, and immediate feedback. Include a few fun and silly questions. Include a space for students to voice their own questions.
Tools to help with live presenting	
Explaineverything	Collaborative whiteboard - students can work synchronously or asynchronously
mural.co	Collaborative whiteboard - students can work synchronously or asynchronously. Comes with templates to help structure thinking, built in timers, the power to summon students to certain areas of the board, voting tools.
doceri	Interactive whiteboard and screencast recorder for iPad
ScreenBrush, epicpen or DemoPro	Allows you to draw on your computer screen on top of any window or app. Epicpen is for Windows, other two are for mac
Wacom graphics tablet	Starts at $60, enables you to draw and write with a stylus on a computer like you can on a tablet. Use with an app like ScreenBrush, epicpen or DemoPro to draw as you present
OneNote	Non-collaborative whiteboard, lessons can be saved in "notebooks" for easy organization
Quickly checking for understanding as we deliver content	
Pear Deck	Teachers can design interactive Google Slides for students to show understanding (multiple choice questions, short written responses, identification) with anonymous results. Can be used synchronously as a whole class or student-paced. Now lets you add voiceovers to individual slides to create self-paced lessons
Socrative	Can be used in class (teacher-paced) or outside of class (individually-paced) to check for understanding; questions can be posed in a variety of formats, and teacher can include feedback (correct answer and explanation)
Poll Everywhere or Mentimeter	Create many types of quick response questions and polls to check what your students are thinking. They also allow text responses, and you can include images.
Padlet	Collaborative pinboard that accepts all forms of media (text, images, video, audio…) and invites discussion

OneNote	Students can use the draw capability on a phone or tablet to quickly draw something to share with you
StrawPoll	Easily create quick multiple choice polls, can see responses develop in live time

Discussion	
Having a discussion	
Poll Everywhere or Mentimeter	Use these engaging polling websites to spark discussions. Or use them mid discussion to see where students are
Zoom/Google Meet etc.'s chat function	Some students feel more comfortable making contributions or "raising their hand to speak" using the chat feature that video chat programs tends to have
Canvas/Schoology/LMS based text discussions	Most learning management systems have a text discussion feature. Text based discussion let other voices in the class shine
Canvas/Schoology/LMS based video discussions	Some LMS's, including Canvas and Schoology, allow video responses on discussions. As with text, different voices will shine
Padlet	Collaborative pinboard that accepts all forms of media (text, images, video, audio…) and invites discussion
Using student generated input to help drive a lesson	
Flipgrid	Teachers can pose questions, tasks, or challenges that students respond to using their choice combination of visual, kinesthetic, and oral response.
Padlet	Collaborative pinboard that accepts all forms of media (text, images, video, audio…) and invites discussion
Google Slides	Create template or blank slides beforehand. Assign one slide on one topic to each student or small group

STORAGE: building long term memory	
Practice of/with recently taught material	
Guided practice (live in-class, synchronous)	
DyKnow	Use it to see students' screens as they work
OneNote	Students can use the draw capability on a phone or tablet to quickly draw something to share with you
Quizlet Live	Quizlet can be played live with a group OR vocabulary sets can be assigned as individual practice
Kahoot	Kahoot can be played live with a group OR question sets can be assigned as individual practice

Gimkit	Gimkit can be played live with a group OR kits can be assigned as individual practice
Independent practice (not live in class, asynchronous, students working "self paced")	
Quizlet	Quizlet can be played live with a group OR assigned as individual practice
Kahoot	Kahoot can be played live with a group OR question sets can be assigned as individual practice
Gimkit	Teacher can assign kits to specific classes with time/point goals as independent practice
Google Doc	Teacher can give comments on first draft of work; students act on this feedback and resubmit
Turboscan	An example of one of many phone apps to turn handwritten answer sheets into pdf's
Giving students timely feedback and a chance to act on it	
Google Docs	Teacher can add comments on students' work or make revisions directly into the document (using "suggestions" tool); teachers can ask questions, offered suggestions, or point out things that need to be corrected
Floop	Students send a photo of their work and you can reply with feedback anchored to points on the photo (good for math/science problems, artwork, etc.)
Canvas/Schoology/LMS-Based Assignments	Teachers can view, annotate (i.e. highlight), and comment on submitted work; students can view this and make changes (upload a second revision of their work)
Formative assessment of recently learned work (to inform next teaching and studying)	
Canvas/Schoology/LMS based quizzes	Can choose to "show submissions with correct answers" so students have immediate feedback on their performance; teacher can also "comment" on answers to provide more detailed feedback. Most LMS's have a quiz feature
Quizizz	Can select modes for gamified "low stakes" assessment of knowledge where individual progress is tracked and recorded. Contains user submitted quizzes that you can adapt
Google Forms	Teachers can make a Google Form into a quiz where answers are recorded in a separate spreadsheet for grading. Some types of questions (multiple choice, choose all that apply) can be graded automatically.
View Results for Kahoot, Socrative, or Quizlet Tests	Teachers can see how their students performed on these (breakdown by question) and determine whether or not additional teaching is needed/who needs individualized support

Robust storage of material in long term memory (spaced practice & retrieval practice)	
Quizlet and Quizlet Live	Assign students to review flashcards or take a "test" on Quizlet and send a screenshot of their work; space these tasks over several days
Gimkit	Teacher can assign kits to specific classes with time/point goals as independent practice
Memrise	This program for learning vocabulary actively in a game-like format also requires students to revisit information over time to build durable memory. For Language teachers only.
Canvas/Schoology/LMS based homework	Assign students the task of studying new content over several days; ask them to upload evidence of this spaced studying on Schoology.
MindMeister, MindMup, bubbl.us	Free online mind mapping software with lots of customizable options for creating organized and meaningful connections within content areas

RETRIEVAL: what have you learned so far?	
Mini-projects (quick, simple multiple-modality demonstrations of learning)	
Google Sites	Ask students to create a presentation one class on a topic (active use of knowledge) and then present it next class (review/share knowledge)
Venngage	Ask students to create a digital infographic, ideally one that utilizes tables, charts, graphs (retrieval) etc., and then present it to their classmates
Glogster	Ask students to create a poster on a topic (active use of knowledge) and then present it (review/share knowledge)
Flipgrid	Teachers can provide prompts, challenges, or experiment procedures/scenarios that students respond to by creating responses based on a combination of visual, kinesthetic, and oral modes of communication
MindMeister, MindMup, bubbl.us	Free online mind mapping software with lots of customizable options for creating organized and meaningful connections within content areas
Padlet	Collaborative pinboard that accepts all forms of media (text, images, video, audio…) and invites discussion
mural.co	A collaborative digital whiteboard and pinboard
Assessment	
Quizlet, Socrative, Poll Everywhere, LMS based quizzes	Good tools to use *before* giving a summative assessment. Use *formatively* to see if students are ready for the test or project

Quizizz	Can select a mode for a formal "summative" assessment in which individual student progress is tracked and recorded
Floop	Students send a photo of their work and you can reply with feedback anchored to points on the photo (good for math/science problems, artwork, etc.)
DyKnow	Allows you to monitor students screens, but requires school-level implementation. Try using DyKnow on a tablet to monitor students while using your computer to present lesson

Transfer of recently learned knowledge and skills to a new context

Tools to help students create projects	
Venngage	Online platform for creating digital posters
Quicktime and GarageBand	Good tools for building podcasts. Make sure students write a script first; the podcast is an engagement nugget for what is essentially a well organized paper.
iMovie	Use with care as it can take a huge amount of time for little benefit in learning. Creating a storyboard to organize your thinking is a crucial step. Consider having students create one minute single shot video on their phone instead. Students have to really condense their thinking, which helps them learn.
Powerpoint or Prezi	Instead of just making a presentation, have students create a screencast of it where they speak as they show slides. Have them use Loom or Screencastify to add video of their face.

Tools to help students collaborate on projects	
Breakout Rooms (Google Meet + Google Docs)	Create breakouts rooms using randomly-generated Meet codes for students to join and collaborate while a teacher monitors
Hangouts	Built in to Gmail, students can video conference privately on projects to collaborate
Padlet	Collaborative pinboard that accepts all forms of media (text, images, video, audio…) and invites discussion
mural.co	A digital whiteboard/pinboard for collaboration
MindMeister	Free mind-mapping website. Allows a group to collaborate on making one map
Slack and Discord	Can create class specific Slacks or Discords, allowing students to discuss, share ideas, and share documents. Privacy settings can be set so that the teacher can see all messages.

If you are from an EdTech company and feel your product has been misrepresented or oddly omitted, please get in touch. No harm was intended.

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