

## Choosing Apps by Design

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By using a few powerful digital tools, we can help students reach important academic goals.

Not long ago, schools were struggling to provide students with access to computers, the Internet, and advanced software. Today, many students enter our classrooms with all three right in their pockets or backpacks. How can we take advantage of our new Bring Your Own Device (BYOD) reality? We might look for answers in blog posts and articles bearing titles like "20 Awesome Digital Learning Tools," or "100 Top Apps for Learning." We might pore over online collections like [APPitic](#) to find the latest and greatest education apps. But is more technology the answer? Will the newest digital tool really show us the way? We don't think so. Instead, we believe that we need to start with learning goals. For those who are familiar with Understanding by Design (UbD), the concept of "beginning with the end in mind" will be familiar. But fewer people may be familiar with the A-T-M organizer introduced in *The Understanding by Design Guide to High-Quality Units* (ASCD, 2011), which explains how teachers and curriculum developers implementing UbD can choose instructional methods on the basis of three distinct, yet interrelated goals for student learning: *acquisition* of knowledge and skills, *meaning making*, and *transfer*.

In this article, we discuss how teachers and students can use a few high-leverage digital tools to enhance acquisition, meaning making, and transfer goals. Just like a master craftsman might use a small collection of favorite tools to accomplish most tasks, teachers and students can use just a few digital tools to achieve many learning goals. We don't mean to suggest that these are the only tools teachers and students will ever need, but we do believe that getting to know a few flexible and powerful tools is more helpful than getting caught up in looking for the hottest new app.

### Tools to Promote Acquisition Goals

Acquisition goals identify the knowledge and skills we want students to acquire. This category includes declarative knowledge of factual information (number facts, vocabulary terms) and basic concepts (vertebrate vs. invertebrate), as well as procedural skills (drawing a picture, dribbling a basketball). Many teachers have become adept at finding online information resources that can extend and enrich students' factual knowledge. Examples include the [Library of Congress](#); the [Smithsonian](#); and [TED](#), which describes itself as "a clearinghouse of free knowledge from the world's most inspired thinkers." But two gentle reminders are in order. First, regardless of which digital tools you select, consider knowledge acquisition not as an end in itself, but rather as the means to achieving the longer-term goals of meaning making and transfer of learning. Second, think beyond digital tools that simply provide *access to* information, and include tools that support students' *organization and management of* information. When learners manage information they have gathered, they move from passive "finding" to the more robust acquisition processes of selecting, organizing, and evaluating.

Here are two core digital tools that can promote knowledge management.

**News feeds.** People set up news feeds so they don't need to search for information; instead, the information finds them. Using RSS (Really Simple Syndication), news feeds enable users to subscribe to new content generated by blogs, podcasts, and video channels—virtually any source that provides regularly updated information. These days most browsers have built-in or easily installed extensions for reading RSS feeds.

Apps designed for tablets and phones have become a preferred way to access news feeds; most of these apps are free to download and support all major devices.

*Collaborative knowledge management tools.* People have long known the benefits of bookmarking favorite websites, but now *social bookmarking* allows information one person saves to be immediately shared with others. [Diigo](#) and [Evernote](#) are two school-friendly social bookmarking apps that can be used on multiple devices. Using Diigo, students can add websites to their collection with a simple right-mouse click, drop-down browser app, or dedicated toolbar. During this *favoriting* process, students can add useful tags and save the websites into a group knowledge repository. They can also revisit a bookmarked page and highlight passages of text or join in threaded discussions embedded right in the page.

These digital tools enable students and teachers to work together and improve the learning process. Whereas students might once have spent a class period individually surfing the Web and noting a few potentially helpful websites, now they act as research team members who collaboratively collect, analyze, and annotate the relevant information they intend to use.

For example, let's look at a middle school science class studying a unit on climate change. As a first step, students are seeking evidence to clarify the factors that may influence global temperature patterns. As they research the topic, they locate many relevant websites, including [National Geographic](#) and the [American Association for the Advancement of Science](#). Students might also use the RSS feed from BBC News—[Science and Environment](#) to get regular updates on the latest news from a respected source.

But collecting this information is just the start. The class uses Diigo to take the personalized information streamed to each student and share it immediately with all the students in the class. Later, students will use an evaluation rubric to collectively rank the quality of the information they find and add comments to each bookmarked site. For example, a student might say: "I found that this source is funded by a Political Action Committee, so the information they provide may be incomplete or biased." These students are evaluating evidence, not just copying and pasting facts.

## Tools to Promote Meaning Making

Meaning-making goals are linked to the big ideas we want students to understand. Students construct understanding as they explore essential questions like *How do we know what to believe about scientific claims? What makes writing worth reading? How do the arts reflect, as well as shape, culture? What do effective problem solvers do when they get stuck?*

Digital tools that support meaning making actively engage learners in constructing knowledge by helping them analyze, interpret, generalize, question, test, evaluate, and synthesize ideas. Here are some core digital technologies that enhance these cognitive processes.

## Thinking Tools and Graphic Organizers

Thinking tools and graphic organizers are analogous to the specialty tools our master craftsperson might occasionally reach for when a particular task requires more than his or her core tool set. These apps and websites are more specialized, helping with such cognitive tasks as categorizing, evaluating, ranking, formulating arguments, and generating ideas. For example, 10th grade students are challenged to present a persuasive argument on a controversial topic, such as the extent to which schools should be able to filter Internet websites. As they struggle to make sense of the disparate viewpoints, students use an array of apps that are provided on the school website. They may start with a shared space like [Padlet](#) to brainstorm the reasons schools might restrict student access to some Internet sites. The class then analyzes and sorts their digital notes into main categories of reasons motivating school Internet policies. Students then individually use [Thesis Builder](#) to develop a thesis statement and an outline for a persuasive essay.

We recommend integrating such specialty tools only after students have become adept at basic information management and have developed a healthy disposition toward inquiry. Most of these newer digital tools allow for three distinct levels of access or sharing—private, collaborative, and public—so students can decide what parts of this work to do independently and what parts to do collaboratively. Initial work may be best done in private and then opened for collaborative input before individual polishing for wider publication.

## Productivity Tools

[Google Apps for Education](#) offers a set of productivity tools that are free for schools. Unlike individual tools, such as those described in the previous section, Google Apps provides a suite of tools—word processing, presentation, spreadsheet, and graphics software—for students to use for constructing knowledge and communicating ideas. Here is one example of how a teacher might have students use these productivity tools collectively.

Armed with Google Apps for Education, high school English students work in teams to complete an online form designed by their teacher. Using the form, each team answers questions about the attitudes of authors from specific movements in American literature toward such concepts as *nature*, *mankind*, *government*, and *the American Dream*. As the teams submit their forms, the information is sent to a spreadsheet that organizes students' insights chronologically by the era of the literary movement. That night, students analyze the collaborative spreadsheet, add comments to it, and engage in a chat session to come up with individual thesis statements that explain their interpretations of how American attitudes evolved over time as illustrated by literature. The following day, students post and review one another's thesis statements through shared documents. Eventually, students will publish their understandings in a composite slide presentation.

As suggested by this American literature example, Google Apps for Education can be leveraged to provide a comprehensive learning experience. When students used the initial form, they were prompted to analyze texts and generalize what the authors might be saying about the identified themes. That evening when students viewed the spreadsheet that collected the group's work, they used the comments and chat functions to question and test their own and peers' hypotheses. Posting their thesis statements online enabled everyone to evaluate the quality of their classmates' insights. Finally, publishing their interpretations prompted synthesis as the team's ideas coalesced into one presentation. Thus, as students are introduced to, use, and choose from this suite of tools, they are empowered with the skills to tackle authentic tasks, collaboratively construct meaning, and communicate their understandings.

## Tools to Promote Transfer Goals

Transfer goals cultivate students' ability to apply their learning in varied situations, beyond the context in which they learned it. Transfer goals have three key characteristics. First, they stipulate what learners should be able to do in the long run as a result of their learning experiences. Second, they require learners to apply their learning to new situations. And third, they involve the capacity for independent performance by the learner.

Indeed, autonomous transfer gets at the heart of college and career readiness—in the world beyond K–12 classrooms, no professor or boss is likely to hold your hand and direct your every action. Transfer requires one to thoughtfully draw from one's repertoire of knowledge and skills to address unpredictable challenges and adjust to new circumstances.

Since the early days of the web, 11th grade students from Immaculata High School in New Jersey have engaged in a project that uses core digital tools to cultivate transfer skills. Because of their teacher's passionate advocacy against child slave labor, many of her students choose to write on this topic for their

research project. If they do, their essays are published on her [Child Slave Labor News](#) website. Until recently, any search engine query for "child slave labor" listed this site first, above every other provider, including Wikipedia and the United Nations. By continually uploading new essays year after year, these students came to be ranked the number-one online information source on the subject. Imagine how these learners feel and how their performance rises to match their status!

An online presence provides an excellent platform for demonstrating transfer. Students can publish their latest thinking and creations for a global audience and receive feedback in the form of comments; they often find themselves participating in authentic learning communities in which people care enough about a topic to collaborate, disagree, and ultimately build new knowledge. What could be a better learning experience? Inspired by the example of the Child Slave Labor News website, we recommend what we call [ClassPortals](#), in which students and teachers work together to create content around a topic they're passionate about. ClassPortals can be sustained for years and can involve successive classes of students. Possible topics range across the disciplines—for example, consider *natural disasters*, *ethics and emerging technologies*, *real-world mathematics*, *people power revolutions*, *tracking climate change*, *persuasive media*, *fit for life*, and myriad other topics, especially those nominated by students. Students join the teacher as interested learners to investigate and research the real-world issues surrounding the topic, to design and create media products to share their knowledge, and to offer solutions. Using a ClassPortal, students can go beyond superficial content acquisition to exercise habits of mind and come to understand the interconnectedness of disciplines.

Unlike a traditional unit of study, a ClassPortal is established for ongoing projects that students turn to whenever they have time, both in and out of class. Students self-select areas and technologies in which to specialize. Thus, if a 3rd grade class created a ClassPortal on "Digging Dinosaurs," some students could develop their scientific drawing skills and others could hone their expertise as writers and editors, while still others could become claymation filmmakers involved in narratives, cinematography, or historical accuracy. In our time-constrained schools, such a website serves as an incubator for mastery of core competencies like writing and persuasion, as well as contemporary skills like creativity, problem solving, and working with others.

The good news is that the technology and skills needed to launch and maintain such a website are relatively easy to learn and can grow with the skills and interests of your ClassPortal team. We suggest blogging software, specifically [Wordpress](#), as a base platform; it's free and easy to use, and it establishes an online learning space to which many other apps and rich media can be linked, embedded, and uploaded. Working on a ClassPortal can also support students' experimentation with many excellent apps available for specific tasks. Students can embed [Prezi](#) segments; [ShowMe](#) tutorials; and [SoundCloud](#) audio clips to entertain or enlighten audiences down the hall or around the world. By providing authentic audiences and meaningful tasks, ClassPortals create the conditions for transfer and enable students to become knowledge producers, not just consumers.

## **In the Digital World, Less Is More**

Today's widespread availability of personal mobile devices underscores a key insight: Schools' greatest technology challenge has never been paying for equipment and adequate bandwidth, expensive though that can be. Rather, the essential question has always been, *How can we use technology strategically to promote the rich learning required for success in the 21st century?*

The ability to find and remember information is important, but in an era when much of the world's information can be Googled on a smartphone, the goals of making meaning from complex sources and transferring learning are at least equally important. Mobile technology can support all these goals—if we strategically

choose and integrate those applications that have the most power to support acquisition, meaning making, and transfer.

*Authors' Note:* For a list of digital tools categorized by learning goal (acquisition, meaning-making, and transfer) see the "[Apps for A-M-T](#)" webpage. We encourage you to suggest core apps that you have found effective and to share classroom anecdotes and tips for their use.

### **A Student View: Seeing the World Through Others' Eyes**

We used mobile technology in my History of the Americas class while we were debating the legitimacy of the Creole elites' motives for independence in Latin America. The affirmative argued a point that we, the opposition, hadn't thought of. We used our phones to look up the definition of *legitimate*; what we learned enabled us to completely negate the affirmative's point.

There are other ways that teachers could use technology to improve learning. They could connect classrooms across the globe through Skype. History classes can sometimes be biased. Isn't it true that in Colorado, a school board member attempted to change the AP curriculum to downplay some darker moments in U.S. history? I think it's impossible to fully understand an event unless a person can hear multiple perspectives.

For example, I think it would be really interesting to look at the American Revolution from the British point of view. Wouldn't it be fascinating to see history, not through the victor's eyes, but through the loser's? Another event, more recent and more accessible through Skype, would be the attacks by Boko Haram in Nigeria. Skyping classrooms there would enable us to truly learn about the situation. Any topic that students are studying that concerns a zone of conflict would be enriched through Skype communications, as long as the region has Internet access.

In the United States, we're blessed with safety, but that safety can also shelter us. In addition, we understand events as filtered through U.S. media. Students in the United States can't possibly understand the gravity of global situations they're not a part of without interaction and communication with people who are living those situations, who deeply understand them.

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