More than just the technology

by Kimberly Lightle

The vast majority of teachers in the United States believe that integrating technology improves student learning (NEA–AFT 2008; Project Tomorrow 2010)—but we know that believing and doing are two very different things. There are many reasons why teachers aren’t integrating technology (lack of access to technology and the need for professional development are two very significant barriers). Teachers who are integrating technology report that students are more motivated to learn, apply their knowledge to practical problems, and take ownership of their learning. Teachers also report that by using technology, students are developing key 21st-century skills including creativity, collaboration, and skills in problem solving and critical thinking. Teachers also see changes in their teaching practice as a result of technology integration within instruction. In the results of a Project Tomorrow survey, over one-third of the teachers reported that, as a result of integrating technology, they are more likely to encourage students to be self-directed, facilitate student-centered learning, and create more relevant and interactive lessons (2010).

Technology can help us do our jobs more effectively and efficiently, differentiate learning, and even motivate students, but I’m convinced that handing a student a mobile learning device or laptop won’t magically improve achievement. How do we provide meaningful learning experiences for students using tools that are intrinsically motivating? Going forward begins by introducing teachers to innovative ways of integrating technology that encourage higher-order thinking skills. Today’s students, regardless of demographics, have shown an interest in digital opportunities to learn, and the range of Web 2.0 tools that make collaboration, innovation, and individual exploration possible is incredible.

Revisiting Bloom’s taxonomy

I think most of us remember Bloom’s taxonomy from our preservice teacher days. We were asked to develop questions and experiences for students that included all of the levels—from Knowledge to Evaluation, from lower-order thinking skills to higher-order thinking skills, and all the levels in between (see Figure 1). In 2000, Anderson and Krathwohl published a revision of Bloom’s taxonomy. This revision turned the nouns into verbs and did some rearranging of terms—from Remembering to Creating (see Figure 2).

In the 10 years since the revision, lots of things have happened, including the birth of Web 2.0, or the read-write web. (Instead of being just a one-way source of information where information is consumed [the read web], the web now allows users to modify existing content, create new content, personalize their web experience, and build online education networks around shared interests [the write web].) Andrew Churches took Bloom’s revised taxonomy and added descriptions to account for the new behaviors and actions emerging as technology advanced and became easier to find and use (Churches 2007; 2008).

Churches connected the verbs in the revised taxonomy to related key verbs and then described how technology could be used to enhance or support a learning experience. He titled this latest permutation “Bloom’s digital taxonomy.” In addition, he added a communication column that includes Texting and Collaborating. He has done a wonderful job of connecting taxonomy elements, keywords, and actions, and suggesting digital approaches and tools. The Bloom’s digital taxonomy matrix can be found at http://edorigami.wikispaces.com/Bloom%27s+Digital+Taxonomy.

Bloom’s digital taxonomy helps us navigate through the myriad digital tools and make choices based on the kinds of learning experiences we want students
to engage in. Instead of putting the tool first, decide the learning goal or the 21st-century skill you want students to become proficient in—then choose a tool that will support your students’ growth toward reaching that goal or skill. Kathy Schrock (2011) has also developed a matrix based on Bloom’s revised taxonomy (Anderson and Krathwohl 2000), which will help you choose a Google tool to support your lesson goals. The matrix is available in her blog post “Bloomin’ Google” (see References).

Remembering and Understanding
Recalling information or knowledge; Building relationships and linking knowledge

Social bookmarking tools can fall under the Remembering and the Understanding elements. Teaching students to comment and tag their resources helps them to construct the meaning of the resource and will bring them to an understanding level. They are no longer just saving a website, they are summarizing and classifying the resource for later use. It is important for our students to be able to understand, summarize, and classify the massive amounts of information they have access to.

Diigo (pronounced dee’go—http://diigo.com) is one of the more powerful social bookmarking sites available on the web. From searching to retrieving to organizing to sharing, Diigo is packed with features...
that will help you use the internet. After downloading a toolbar to your browser, you’ll be able to add web addresses, titles, descriptions, and tags by clicking on a single bookmark button. These bookmarks can be accessed from any computer, meaning that your saved information is always within reach. You can also add a website to a list and share it with friends or a group.

With the Diigo educator account, you can create student accounts for you entire class, without the need for email addresses for the registration. Social bookmarking is a valuable tool to help students in recalling the vast amounts of information that are available to them. Bookmarking websites and resources to Diigo will allow students to retrieve information both quickly and effectively.

Applying
Carrying out, running, or executing procedures

The third element in the taxonomy is Applying, which Andrew Churches says is the level where students take advantage of tools, use information, and execute tasks. A big aspect of this is “doing.” The great thing about the Applying taxonomy level is the number of options available to students. Examples of tools that students can use include more established tools such as PowerPoint, Skype, Google Apps, iPhoto, iMovie, and Flickr. MakeBeliefsComix.com and Glogster are two you might not be as familiar with.

MakeBeliefsComix.com (www.makebeliefscomix.com) does not require registration and allows students to create a short comic strip. There are many characters to choose from, each featuring four different expressions. Students can add speech or thought bubbles, resize characters, add items to each frame, and email their finished comics to their teacher. Alternately, students can print out the comic strip and color in background objects to get their point across. This is a great entry point for students who claim they can’t draw.

Glogster (www.glogster.com) appeals to students who are visual learners by allowing them to create their own poster. Students have options on the background, color, and pictures or videos they wish to add. Students love how Glogster allows them to highlight text and have it “pop” out. Glogster also allows students choice in the type of multimedia they use. Students can find pictures, video, and music to incorporate into their poster.

Analyzing
Making connections, comparing, organizing, and presenting information

Online applications such as Prezi and Wordle provide students with opportunities to make connections and analyze and present information in uniquely visual ways.

Prezi (http://prezi.com), a great service for taking presentations beyond bullets and pictures, is a zooming digital presentation editor. Unlike PowerPoint, Prezi is free and extremely portable. Because it is web based, Prezi can be created and shown on any computer with web access. If there is no web access available during your presentation, a downloadable version can be obtained to show offline anywhere. No other software is needed, not even Flash. Prezi also performs quite well in creating a visual organizer. As Prezi claims on its site, “With the help of Prezi, you can create maps of texts, images, videos, PDFs, drawings, and present in a nonlinear way.”

Wordle (www.wordle.net) is a tool for generating “word clouds” from text that you provide. The clouds give greater prominence to words that appear more frequently in the source text. You can tweak your clouds with different fonts, layouts, and color schemes. The images you create with Wordle are yours to use however you like. You can print them or save them to the Wordle gallery to share with your friends.

Evaluating
Making judgments, validating, and reflecting

A VoiceThread (http://voicethread.com) is a collaborative, multimedia slide show that holds images, documents, and videos and allows people to navigate the slides and leave comments in four ways—using voice (with a microphone or telephone), text, audio file, or video (via a webcam). A VoiceThread can be shared with friends, students, and colleagues for them to record comments. Students or teachers can post images to the thread, and then other users can add written, spoken, or videotaped comments about the images. This is a great way for students to discuss a topic asynchronously and perhaps even across multiple classes.
Blogs (http://edublogs.org) have many uses in education, including knowledge sharing among teachers, students, and parents. Teachers often start blogs to communicate with students and parents. This can include just the posting of homework or other assignments in one easy-to-find location. Other times a blog can be a rich description of things taking place in the classroom, showing parents what their children are working on or helping a student who is absent. Students can also have their own blogs, both private and public. Students and teachers have the ability to publish posts as well as receive feedback on their writing in the form of comments. Publishing their writing to their blog provides an authentic audience for students.

Creating

Remembering, understanding, and applying knowledge; analyzing and evaluating outcomes, results, successes, and failures

The sky is the limit in terms of student creation—students can program using Scratch or Storytelling Alice; direct and produce film, animations, and digital stories; and publish text and media. The ability to create is an important part of developing higher-order thinking skills and provides students with an authentic learning experience.

Scratch (http://scratch.mit.edu) is a programming language that makes it easy for students (and teachers) to create their own interactive stories, animations, games, music, and art—and share those creations on the web. As students create and share Scratch projects, they learn important mathematical and computational ideas while also learning to think creatively, reason systematically, and work collaboratively.

Storytelling Alice (www.alice.org/kelleher/storytelling/#) is a programming environment designed to motivate a broad spectrum of middle school students (particularly girls) to learn to program computers through creating short 3-D animated movies. Storytelling Alice includes high-level animations that enable users to program social interactions among characters, a story-based tutorial that introduces users to programming through building a story, and a gallery of 3-D characters and scenery with custom animations designed to spark story ideas.

A wiki (http://pbworks.com or www.wikispaces.com) is a website that can be edited by multiple users. The wiki web page starts as a very simple, blank form. Anyone with basic word processing skills can get started working on a wiki. The “Link” button is what makes the wiki come to life.

Animoto (http://animoto.com) and JayCut (http://jaycut.com) allow video creation and editing. On Animoto, students can, in a short amount of time, create video slide shows set to music that appear professionally done. A folder of images can be uploaded, text slides can be added, and music selected; Animoto does the rest. JayCut allows students to work with short video segments and edit them online, much like Windows Movie Maker, but without the platform issues because it’s a web-based tool.

References


Kimberly Lightle (klightle@ehe.osu.edu) is a science teacher educator at the Ohio State University and is principal investigator of the Middle School Portal 2: Math & Science Pathways social network for middle school math and science teachers (http://msteacher2.org).