Personalizing Learning
with
Digital Devices

Tools for Teachers

Center on
Innovations
in Learning

by

Susan Hunsinger-Hoff

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Editor's Preface

This guide provides a trove of information on digital tools and practical examples that educators can use in classrooms both to create a personalized learning environment for students and to focus that learning on skills needed for success in the 21st century.

Based on research (Redding, 2012) and U.S. Department of Education policy (2010), the guide—compiled and written by Susan Hunsinger-Hoff, rests on the idea that personalized learning, that is, learning tailored to each student, who is also closely involved in directing his or her own learning pathways, is a key to better student outcomes. Such tailoring makes, at least, the time, place, and pace of learning dependent on student needs and preferences, and digital devices make this kind of personalization a realizable goal for educators.

Fundamentally, the guide understands that tailored, personalized learning can't be realized unless teachers know their students well—their interests, their prior experience and learning, and what motivates them. Consequently, the first two sections of the guide are devoted to showing how teachers and students can come to know one another better; each section lists applications that help students explore and express themselves and apps that provide teachers insight into students' self-perceptions. In the third and fourth sections, the guide advocates flipped classrooms and project-based learning as models that can take advantage of digital learning in the drive to personalization; it provides narratives that show these two models in practice in real classrooms and lists digital resources relevant to practice.

In positing that digital tools can help achieve these ends, the guide recognizes that students need appropriate technological skills, so the fifth section addresses "Internet literacy." This fifth section lists websites and apps that promote facility with digital learning appropriate to specified student grade levels.

All of these sections also consider the ways digital tools can enhance students' learning of 21st-century skills, the skills that students need to develop in order to succeed in the information age. But it is the fifth and following sections that are particularly devoted to demostrating how those skills might be developed through digital media in various grade levels. The guide takes its definition of 21st-century skills largely from the publications of the Partnership for 21st-Century Learning (formerly the Partnership for 21st-Century Skills), from Wagner (2012), and from two publications by Redding (2013, 2014).

Of the skills identified by the Partnership as indispensable for academic, career, success and life success, the guide emphasizes four skills increasingly "recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not" (Partnership 2015, p. 9):

- creativity
- critical thinking
- communication
- collaboration

The skills identified as crucial by the Partnership—the Four Cs, for short—exactly coincide with several of the "seven survival skills" advanced by Wagner (2014): (a) critical thinking, (b) problem solving, (c) effective oral and written communication, and (d) collaboration across networks. Wagner, who distilled his list of skills from interviews with business leaders and others, has recently also been promoting the need for developing students' ability to create and innovate, which also corresponds to the Partnership's first critical skill. According to Wagner,

because of the Internet, knowledge is now free, immediately and widely accessible, and constantly changing. As a result, he has said, "The world no longer cares how much you know—no competitive advantage—because the person next to you can go figure it out and learn it just in time" (Nov. 10, 2014 https://www.youtube.com/watch?v=6I6S6bDn31s&feature=youtu.be). In his view, what a person can do and create with information—innovation—becomes the key commodity for 21st-century learners.

Wagner's assertion, focused on after-college careers, is clearly hyperbole—no engineering firm is going to hire a person without the requisite background in physics, mathematics, chemistry, and so forth. One can't learn differential equations "just in time." Redding, on the other hand, understands that what a person can do will be impacted by his or her prior learning, that prior learning "provides associations and understanding to facilitate new learning" (2014, p. 6) and, undoubtedly, innovative thinking. That prior knowledge, which Redding calls "cognitive competency," is one of four "competencies" that Redding argues are fundamental for success in learning, the other three being metacognitive competency, motivational competency, and social/emotional competency. Many of the learning and skills of students adduced by Partnership for 21st-Century Skills and Wagner can be categorized under Redding's categories of personal competencies and are also generally relatable to the those espoused by advocates of "deeper learning" (Redding, 2016). Without attempting to make distinctions among what are undoubtedly overlapping terms, the student skills addressed by the technologies listed in the tables that follow may be organized according to Redding's schema of personal competencies:

Cognitive	Metacognitive	Motivational	Social/Emotional
Basic literacy	Critical thinking	Creativity	Communication
Reading	Logical thinking	Project-based learning	Collaboration
Internet literacy	Problem solving	Flipped classroom	Digital citizenship
Media literacy	Self-assessment	Student choice	
Global and multi-cultural learning	Reflection		

The guide concludes with a section on the use of digital devices in assessment and is addressed to teachers.

A note on the resources listed in the tables that follow each section: Although Susan Hunsinger-Hoff focused this guide on Apple devices, the iPad and the iPhone, many of the apps listed or similar ones are also available for Android devices. In addition, the editors of this text have added pricing information when, in confirming the currency of the each URL, it was readily discernible. Not listing a price does not mean that the resource is free. Even "free" versions, which may be relatively basic, may require in-app purchases to make them useful; and versions with more features than the basic version may be available but not noted in this text. Generally, this guide to digital resources should be used in conjunction with the publication *Creating a Content Strategy for Mobile Devices in the Classroom* (Mahon, 2014), which guides educators through the process of selecting applications for use, including what to avoid; rubrics for evaluating apps are also included.

Personalizing Learning with Digital Devices

by

Susan Hunsinger-Hoff

Getting to Know Students: Part 1

During the first week of school, when teachers are usually screening for reading and math competencies, a few additional surveys and engaging activities can be presented that get to the heart of personalization, learning about each student as an individual. If students have personal learning devices like an iPad or Chromebook, an assignment using a simple word-cloud creator app, such as WordClouds, Wordle, or Tagxedo, is an enjoyable way for students to tell about themselves. Students are prompted by the teacher to list nouns, verbs, adjectives, and adverbs (described as such according to the level of understanding of parts of speech) that produce an all-about-me account of how the child sees herself or himself as a student, a person, a dreamer.

Through these activities, a teacher can learn much from the student's choice of color scheme, layout, text, and his or her approach to the task. The resulting graphic provides an attractive display, and a sense of accomplishment, all attained in a short amount of time. Because these creations are digitized, they can easily be added to students' portfolios as a title-page-ready record of their interests, hopes, fears, achievements, and goals—hatever is prompted by the teacher or arises as the class brainstorms and reflects individually and together on possible categories. Using the app PhotoBombs with student-chosen photographs on content topics (American history, the rainforest…whatever), students have a wide freedom of choice to express their views of themselves. The end results speak volumes about their self-image, attention to detail, and their tech savviness.

Art teacher Jessica Killo gets to know her intermediate level students in the beginning of the year through her Selfie Portrait Project, an activity that provides insight into the self-image and work ethic of her students. In a relaxed environment with music playing in the background, students take selfie photos with their iPads. Then, using Sketchbook Pro, they embellish the photo to further personalize the photo. The children decide whether their content will be funny, serious, or emotive.

Using mini-lessons to introduce the concept and the technology involved, Ms. Killo gives the basics, then lets students figure it out from there. "They teach each other," she says, affording her the time to work individually with those students who require her immediate attention. Given freedom of choice in how they approach each activity, the students disclose what they are worried about, what makes them laugh out loud, and what super power they'd like to have, all through their art, all in a risk-encouraged environment. It's a meaningful way for the teacher to get to know close to 200 students as individuals. Reflection is encouraged as each student is asked to state what he or she learned in the process of creating the art before it is placed in their digital portfolios that follow them from kindergarten through 12th grade. Cognitive, metacognitive, motivational, and social/emotional competencies are all addressed in Ms. Killo's art classes as she puts into action the framework Partnership for 21st Century framework (2015), emphasizing thinking creatively (brainstorming, creating new ideas, refining and

evaluating ideas), working creatively with others (being open to diverse perspectives, demonstrating originality, viewing failure as part of the process), and implementing innovations by acting on creative ideas.

Any activity that allows students to make their own choices, and is guided in an environment that values expressions of individuality, enables observant teachers to get to know their students well. Using apps like Explain Everything and Educreations in class or at home in a show-me-what you-are-learning activity can illustrate a child's thought processes and approach to learning. Such apps can be used for demonstrating anything from how to make a peanut butter and jelly sandwich, to clarifying a physics concept like the Bernoulli Principle, or explaining how a multi-step math problem is solved. Observing a student involved in the math app, Hands On Equations, a pre-algebra manipulative on the iPad, or playing a game like Minecraft, and who later transfers the skills to content-specific projects (click **here** for an example) enables teachers to see explicitly how children's brains work differently.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Educreations Interactive	K–12	Creativity Communication Collaboration Critical Thinking Assessment	Students demonstrate what they are learning…any topic/subject.
Explain Everything Interactive	5–12	Creativity Communication Collaboration Critical Thinking Assessment	Students show what they are learning…any topic/subject.
Hands On Equations [costs vary]	3–6	Critical Thinking Problem solving Logical thinking	Students work interactive pre-algebra manipulative at their own pace, showing/recording their thought processes as they proceed through the course.
Minecraft [$26.95.]	4–12	Creativity Motivational Critical Thinking Problem Solving Logical reasoning	Students play the highly engaging game while gaining transferrable life skills of tenacity, reasoning, and resilience
• **Photobomb** [99¢.] • **Sketchbook** [free] • **Sketchbook Pro** [$2.99/month]	3–12	Creativity Motivational Social/Emotional	Students create photographic artwork. Teachers get to know students as they learn the tech tools
• **Wordle** • **Tagxedo** • **WordClouds**	K–12	Creativity Critical Thinking Communication Formative and Summative Assessment Reflection	Students practice higher order thinking skills by brainstorming, analyzing, categorizing, and organizing ideas into creative concept maps.

Note. Some apps and websites that are Flash driven (Wordle, Tagxedo, Scratch, the BGfL multiple intelligences inventory, and certain ReadWriteThink.org student interactives) will work on an iPad if opened through a browser app such as **Rover** or **Photon**.

Getting to Know Students: Part 2

One of the most important pieces of getting to know students is to learn how they view themselves as learners. Tools such as the Birmingham Grid for Learning, an inventory based on Howard Gardner's (1983) theory of multiple intelligences, can elucidate for children that it's not how smart you are, it's how you are smart! Viewing the graphic results of this inventory can make for many "aha!" moments for the students as well as their teachers, especially when children learn they are very smart in ways that have never shown up on math or reading tests. For example, a teacher who discovers a child's intelligences as naturalistic and interpersonal can personalize accordingly as she puts her "people person" to work on a nature survey or scavenger hunt, animal study, campaign manager, or ambassador for animal rights or the environment, director/producer of a nature video, and so on.

In addition to kinesthetic, linguistic, naturalistic, visual/spatial, musical, logical, interpersonal, and intrapersonal "smartness," and the later added, ethical or moral smartness, I would add "technological intelligence" to Gardner's list. Some children are born with it, and it is fairly simple to identify. These are not necessarily the fastest-thumbed students or the "quicker clickers" on the keyboard, but ones who know intuitively how to troubleshoot or discover the shortcuts and tips in using the technology; and if they don't know how, they will doggedly work to figure it out. Appointing these motivated students as tech mentors or part of a technology team of assistants who give individual help to others in the class who need it will do much for their self-respect and wonders for moving an iPad program off the ground. It is indeed empowering for every student to know that they are smart in some, usually several, ways. Empowering students by guiding them to discover and take pride in their strengths, as well as acknowledge and accept their shortcomings as opportunities can set the stage for a year-long quest in the classroom when intelligences are recognized and celebrated.

These are just a few of the myriad ways teachers can come to know their students as individuals. Even a simple assignment like the one from a Denver, CO, elementary school teacher, aired on ABC's *World News Tonight* (April 22, 2015), can be very revealing. The sentence completion exercise, "I wish my teacher knew_____ because _____," drew national attention for the depth of insight into the lives of the students that it disclosed. Activities such as this should be the norm in today's classrooms.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Birmingham Grid for Learning	2–12	Metacognitive Formative assessment	Students access online survey to discover their many different intelligences.
Education Planner	9–12	Metacognitive Formative assessment Self-assessment	Students use interactive self-assessments to discover what they are good at and where they may have room for improvement. They identify the things that interest them and get some ideas about careers to explore.
Google Forms To see a sample, click **here**.	1–12	Metacognitive Reflection Formative assessment Self-assessment	Teachers create tailor-made online surveys to ascertain students' intelligences, motivations, interests, learning styles and modalities, skills, preferences, etc.
Literacynet.org	10–12	Metacognitive Formative Assessment	Students access online survey to identify preferred intelligences and take inventory of their skills.
M.I. Magnet Man & Smarts Survey	K–2	Metacognitive Formative Assessment	Students engage in offline activity to explore their many intelligences.

The Flipped Classroom

Flipping the classroom is a means to provide students with personalized instruction. In this educational model, students learn new content at a time and place of their choosing by watching video lectures or other online sources. Problems formerly assign as homework are completed at school with teachers offering personalized guidance instead of lectures during class time.

Flipped classrooms are functioning around the country in K–12 personalized learning environments. Instructional technology coordinator Carol Siwinski has transitioned her school in Philadelphia, PA, to a 1:1 iPad environment with flipped classrooms:

> Adopting Canvas by Instructure as our [learning management system] has been a game changer for us, affording us the opportunity to flip our classes. Students and faculty are now computing anytime, anyplace, since everything is being done in the cloud. Canvas allows teachers to post content (text, audio, or video), assignments, discussions, quizzes, etc., and students can access all this through their devices, submitting the final product right back to Canvas. Teachers can then grade online along with voice or text comments and within minutes students receive notification that their work has been assessed.

This tool has allowed teachers in Grades 9–12 to flip and blend their classes between learning at home and in school more easily.

Math specialist and curriculum coordinator at Germantown Academy in Fort Washington, PA, Susan McHugh has been an instructor in flipped classes in Grades 1–5 for years. As she works through her daily lessons in class, she uses screen casting in conjunction with an interactive SmartBoard to record her lessons, including what she writes, and all her students' responses and questions. She then posts these videos on the school's virtual learning environment (VLE), It's Learning. Absentees or students who need further clarification or reinforcement of the skill or concept taught can readily do so later, at their own pace in their own space. Students are sometimes directed to Khan Academy tutorials that might aid in their understanding of particular concepts. McHugh says the "greatest thing about the video lessons and tutorials is that children who just don't get it, who used to go home in tears, can now review the material as many times as necessary, with the teacher virtually right there." Digital textbooks are also used in math classes as a means to flip the classroom, providing interactivity, animations, and videos to reinforce concepts, even topic tests that students can do at home on their digital devices. These texts have been motivating according to McHugh, "They love to take the tests on the iPad because of the immediate feedback; the program keeps track of scores, assigns remediation, thus personalizing, assessing, and prescribing. Students display tenacity as they keep going on a lesson just to get better." Parents are kept informed about what is being taught in the classroom in a blended learning environment, an added bonus in this learning partnership.

Schools that have flipped their classrooms and have truly blended learning for their students have first ensured that each student has equitable, reliable access to the technology and the resources.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
EdShelf [search: "selves," "flipped"]	K–12	Creativity Communication Collaboration Problem Solving Personalized Learning Differentiated Learning Assessment	Teachers access a community of practice, a forum for sharing best practices in flipped classroom instruction.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
A Great Overview of the Flipped Classroom	K–12	Creativity Communication Collaboration Problem Solving Personalized Learning Differentiated Learning Assessment	Teachers access an overview of the flipped classroom that describes a full cycle of learning that a flipped classroom affords, as well as a comparison of some major tools to use for a flipped classroom.
Teacher-tested Tools for the Flipped Classroom	K–12	Creativity Communication Collaboration Problem Solving Personalized Learning Differentiated Learning Assessment	A webpage with links to various tools, mostly available on EdShelf.
The Flipped Classroom Model: A Full Picture	K–12	Creativity Communication Collaboration Problem Solving Personalized Learning Differentiated Learning Assessment	Teachers can view the flipped classroom model, where the video lectures and vodcasts (podcasts that contain video content) fall within a larger framework of experiential learning activities.
Khan Academy	K–12	Personalized Learning Differentiated Learning Assessment	Teachers and students access video presentations and tutorials from a personalized dashboard, on numerous topics from many disciplines.
Virtual Learning Environments (VLEs): • Blackboard • Canvas • Edmodo • It's Learning • iTunesU • Moodle	K–12	Creativity Communication Collaboration Problem Solving Personalized Learning Differentiated Learning Assessment	Teachers and students gain access to virtual learning environments that provide a forum for delivery of content, posting of challenges, problems, and projects, collaboration, communication, submitting work, and digital assessments.
Virtual Learning Program Rubric	State and Local Education Agencies	Assessment	An extensive, detailed, standards-based rubric to evaluate virtual learning programs and their curricula.

Project-based Learning

Personalized learning is not a linear process: Students follow their individually selected paths of inquiry and discovery. When a meaningful, relevant project is set, either by the teacher or the students, with lessons that are embedded with pertinent questioning and scaffolding, and students are encouraged to work on projects anytime, anywhere with the aid of technology, learning occurs with "increased motivation, a more satisfying teaching experience, and new ways to connect with parents and the wider community" (Larmer, Mergendoller, & Boss, 2105). Project-based and challenge-based learning environments:

- promote a flexible framework for learning with multiple entry points
- provide a scalable model with no proprietary systems or subscriptions
- place students in charge of their learning
- focus on relevant, real-life problems and global challenges with local solutions
- promote the authentic use of technology
- develop 21st-century skills
- encourage deep reflection on teaching and learning (see, for example, Apple, 2010; and Vega, 2015)

Some projects that are initially teacher-driven gradually release ownership of the learning and provide ample opportunities for individual pursuits. Projects like the Green Toys Shop (Carver Sekeres, Coiro, Castek, & Guznic-zak, 2014), in which young students are tasked with finding environmentally friendly "green" toys for use in a new shop soon to open in town, support the idea that specific, logistical, and instructional designs can help students work through inquiry tasks in productive ways. Students use the Internet to learn more about ecologically appropriate materials and to search for eco-friendly toys. The students then are directed to send to the Green Toys Shop's owner emails recommending three toys and the reasons that they were chosen. Young students have no trouble embracing high-interest projects like conducting research on toys.

Teacher-created interactive iBooks that provide multi-level texts and multimedia paths through them are an effective way to differentiate content and its method of delivery in order to personalize student learning and provide the constructs for a project-based venture. Armed with iBooks Author and a rich core curriculum with targeted skills appropriate for the developmental levels of the students, teachers can generate digital textbooks that fit the needs of their students, with jumping off points for individuals to pursue topics, concepts, skills, or strategies that they need or are of interest to them. iBooks can be created for research projects or any component of the curriculum to facilitate meaning-making connections. An example is Germantown Academy's fifth grade "Flight Project," wherein students combine history and math to explore the lives of the Tuskegee Airmen of World War II, and simulate their wartime campaigns. Guided by their "Tuskegee Airmen Flights" iBook, students access the History Channel's Tuskegee Airmen "Dogfights," a multimedia simulation downloaded from iTunes; participate in a flight simulation as they explore Google Earth for flight paths; learn history through digital texts and websites; and learn about the physics of flight from online, real-time interviews with pilots—all while gaining critical communication, collaboration, and problem-solving skills. During the project students pose questions and make critical decisions as a team, prompted by their teacher-created iBook that helps them explore rate, time, and distance problems in the context of the history of World War II and the famous exploits of the African American pilots. Children master multiple core standards and learn to work together in an engaging activity. Collaborative projects like this, with emphasis on problem solving and critical thinking, are highly motivating for students in the intermediate and upper grades.

Project-based, real-life activities are motivating and essential for engagement and ownership of learning in the personalized classroom. To that end, many classes have instituted a "genius hour," during which, for one hour or one day per week, students can pursue any passion-based topic in which they choose to become an expert (20 Time in Education, n.d., "Genius hour"). In their 1:1 initiative in Baltimore, MD, elementary schools administrators and teachers have changed the curriculum with a "catch and release" practice. Teachers instruct small groups for 7 to 10 minutes, then release students to work with their digital tools to create something of

their choosing that demonstrates the topic or skill. The 20-Time Project (20-Time in Education, n.d.), in which students spend 20% of their class time in researching questions and topics of their choice, is another attempt to place learning initiatives in the hands of the students. The past few years have seen countless student-initiated-and-produced documentaries and full-feature videos on bullying, body image, gender identity, race, and other issues important to today's youth. These productions are beginning to hit the global stage and epitomize student motivation and meaningful, relevant educational pursuits.

In Centennial School District in Warminster, PA, literacy coach Cheryl Lyman instills communication and col-laboration skills beyond keyboarding, word processing, slide shows, and importing music and images into presen-tations. This "Classrooms for the Future" innovator has promoted her media literacy program among elementary school students by installing a TV studio complete with two green screens, cameras, microphones, and a tele-prompter. Students broadcast every day after they have collaborated on a script that includes school announce-ments, issues to think about, even jokes of the day. "Even my lower level literacy students create pages of jokes for the TV show….One child, who previously could barely compose a sentence prior to the institution of our daily newscast, submitted six pages of writing for collaboration and editing by the team," Lyman adds.

In Graham Martin's fourth-grade classroom, students use their iPads whenever they need them for any pursuit, problem, or project. In researching the colonies of Jamestown, Roanoke, and Plimouth Plantation, students use *World Book Online* on their iPads, but are not restricted by this one source. Students find their own sites to investigate, for Martin, who believes that students should not be constrained to "safe spots, teaches student "how to think smart" for open exploration. Using a system he developed called ICE (I Choose Everything), Martin prompts his students to tell everything they can about these three colonies. They have two days to do it. Time in class and at home is devoted to reflecting about the process and organizing their findings. Students then present what they know using whatever means they wish. Using Reflector, an iPad pro-jection tool, students share from their iPads, with presentations taking the form of Educreations, Google Docs, Keynote, Inspiration. Popplet, iMovie, and any other media production device, site, or app they discover. Final presentations are used as formative assessment, and if a child feels she hasn't measured up, the other stu-dents pitch in to help. Positive peer pressure runs high in this kids-teaching-kids, student-driven, project-based learning environment.

In Connecticut, the Education Connection Learning Management System's Center for 21st Century Skills (Education Development Center, 2016) believe the key to developing a generation of successful American innova-tors is to encourage the convergence of art, business, creativity, innovation, engineering, and science, describing six critical skills: information literacy, creativity and innovation, collaboration, problem solving, communication, and responsible citizenship. In Warminster, PA, Al Catarra, the school district's business and computer applica-tions specialist, has done just that. Catarra works tirelessly to develop partnerships and affiliations with local businesses, hospital, universities—anyone who will grant him an audience and potential funding and program support—in order to develop hands-on, authentic projects. High school Principal Dennis Best empowers Catarra to be innovative in his role of business teacher, creating courses such as business law and personal finance, and internship programs with local hospitals with retirement communities, and with universities. He has initiated a college and career center, an actual ShopRite grocery store, and a working TruMark Financial Credit Union, both of which are run by motivated, engaged students, differing in abilities and interests but learning real-life skills that tap their potential.

A strong proponent of science, technology, engineering, and mathematics in the curriculum, Catarra has also integrated the arts into his school's STEAM curriculum, using high-tech microphones for the school musical, one of his passions. His partnership-in-action days, half-credit internships, full-credit entrepreneurships, full-credit career prep electives for gifted, average, mainstream, and special education students take full advantage of peer mentoring, job coaches, and 10 work sites around the county. Catarra believes that by addressing "one kid at a time" in passion-based, hands-on learning programs, there is a return on the investment of time and money from businesses, corporations, and teachers. With daily use of the tools of the trade, computers, tablets, iPhones, iPads, scanners, cash registers, coding software and apps, and microscopes, students graduating from this high school have created and are following their chosen, individual paths through their projects.

Including robotics, 3-D printing, and even drone technology in a few of the more innovative and well-funded middle and high school STEAM classes has piqued students' interest and motivated their pursuit of further study and careers in STEAM. Many more high schools have the resources to embrace the "maker movement" in education with projects that embody most of the principles of innovative, personalized learning. The authors of *Makerspace Playbook* propose that students can "learn to identify their own challenges, solve new problems, motivate themselves to complete a project, engage in difficult tasks, work together, inspire others, and give advice and guidance to their peers" (Hulbinka et al., 2013, p. 22). Recognizing teachable moments and the freedom from curricular and scheduling restraints in order to explore those teachable moments can make all the difference. In the classroom, the application of these principles need not be restricted to "design days" and "tinkering workshops" that are formally scheduled a few times a year: They can become an option for anytime, anywhere learning.

Charter schools like San Diego's High Tech High, which replaces standardized tests and compartmentalized subjects with project-based learning and a student-focused curriculum, offer an alternative to traditional instruction. The acclaimed documentary, *Most Likely to Succeed* (Whiteley, 2014) follows students, teachers, and parents to see if this different model can reawaken the love of learning and offer the potential for a paradigmatic shift in education. Exploring alternative ways of schooling, specifically the model developed by Larry Rosenstock, the film does not offer a prescription but it criticizes the old model of rows of compliant students regurgitating facts and celebrates active engagement, challenging work, and authentic project-based demonstrations of learning.

When posed with a real-life problem to solve or a relevant project to pursue, students are more likely to learn everything they need to know to find solutions to that problem or complete their project. Consider Colin Consavage of Claymont, DE, an intrinsically motivated and resourceful 10-year-old, who, intrigued by bionics, created a prosthetic hand using the Wilmington Public Library's 3-D printer. Provided with a slew of materials and resources, both tangible and virtual, in a risk-encouraged project-based learning environment, students' communication, collaboration creativity, innovation, and critical thinking skills can be heightened (Wilson & Conyers, 2011).

Apps, Websites and Other Digital Resources	Level	Personalization: What It Looks Like in the Classroom
• 20-Time Project • Genius Hour	2–12	Students are provided 20% of class time, or one hour per week, to work on and explore one topic of their choice.
Challenge-Based Learning: An Approach for Our Time [free research report, 2009]	SEA, LEA staff, and teachers	This extensive report claims students are motivated by real-life challenges that are posed by teachers or peers and work collaboratively to solve problems.
Educreations [free and various pricing]	K–12	Interactive whiteboards enable students gather, organize, and creatively present information. E.g., children create math problems or pose questions and record their own voice explanations of how they would solve the problem or answer the question.
Google Docs	K–12	Students contribute to shared documents in a password-protected forum. Teachers can initiate a Google Doc as an "Internet Inquiry Basket," a repository for all of the students' wonderings, and students log their inquiries in their own "Wondering Notebook."
Google Drive	3–12	Students and teachers store photos, stories, videos, recordings and more online for easy access for collaboration and assessment.
Google Earth	2–12	Teachers and students create multimedia treks around the globe.
• iBooks [cost unknown] • iBooks Author [cost unknown]	K–12	Teachers and students create multimedia, interactive, multilevel texts on any topic. May require purchase of application and content.
iMovie [$4.99]	K–12	Students gather, organize, and creatively present information.
• Inspiration [various costs] • Kidspiration [various costs]	K–12	A variety of applications that enable students gather, organize, and creatively present information.

Apps, Websites and Other Digital Resources	Level	Personalization: What It Looks Like in the Classroom
Popplet [$4.99]	K–12	Students gather, organize, and creatively present information, showing their thought processes and demonstrating their learning of self-chosen topics in interactive, multimedia.
Reflector 2 [14.99]	K–12	Wireless mirroring of mobile device screens onto large presentation screen for entire class to see; provides a means for each student to share what he or she has been creating in class.
Worldbook Online [$120.95, one 1-year subscription]	K–12	Students access online encyclopedia research topics

Internet Skills

Educators need a wealth of materials on which they can rely as they begin to move less tentatively towards developing personalized projects that demand students use the Internet. Coiro (2013) offers instructional techniques that actively engage young children in the beginning stages of inquiry using the Internet, including practical ideas and examples of how to implement Internet-based activities such as "inquiry baskets," "mystery photos," projects using VoiceThread, and "structured inquiry circles" in ways that involve children in formulating their own questions, then participating in various language and digital literacy experiences to answer them.

Fifth-grade teacher Phy Chauveau instituted "I Wonder Wednesdays" in her class at Germantown Academy in Fort Washington, PA, beginning with an Internet inquiry into the world's threatened ecosystems, an interdisciplinary unit. Students' queries range from dangerous animals to natural cures for diseases, to the tattooed and pierced Yanomami people of the Amazon. Students who ordinarily have difficulty knowing where to begin researching a topic or beginning a writing project, even one they are keenly interested in, find it possible to get started through the use of multimedia. Video clips or transformative interactive learning tools like graphic organizers can provide visual representations and aid in comprehension and in the brainstorming and drafting processes. Using concept-mapping and digital content creation tools like Kidspiration, Inspiration (both listed above), Bubbl.us, Board Builder and BiblioNasium, children record what they read, notice, wonder about, and are driven to discover even more about, causing a domino effect in what the entire class learns. Chauveau explains:

> While I've long been comfortable with encouraging students to explore and create using their preferred learning styles, the integration of a 1:1 iPad learning community during the past school year brought a level of student engagement I'd not yet experienced—and could not have imagined. Opportunities present themselves at every turn for building meaningful and memorable learning connections via the Internet. Academic curiosity grows, along with the children's personal resilience. Genuine excitement is generated among students when sharing and then reflecting on their own learning, both with one another and with a wider real world audience via the Internet. The deliberate curation of digital resources for the purposes of truly differentiating instruction for my students might well be the most challenging work I've yet to accomplish in all my years of teaching; it has also been the most rewarding.

Interspersed throughout Internet research projects such as these are lessons on digital skills using many teacher-made activities that address online reading comprehension, Internet safety, and critical analysis of websites, as well as the published standards-aligned resources (see for example websites of the Common Core State Standards Initiative, the American Association of School Librarians, and the International Society of Technology Education) that engage the students in interactive activities to enhance their digital literacy and citizenship in a connected culture.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
BiblioNasium	K–8	Communication Collaboration Critical Thinking Creativity Basic Literacy	Students participate in a secure online reading community where they share reading logs, discover new books to read, and contribute to book talks. Students easily share book reviews and recommendations. Teachers can manage & monitor reading lists and reading challenges for each student.
Bubbl.us	2–12	Communication Critical Thinking Basic Literacy	Students use this concept-mapping app to brainstorm, plan, and organize their projects.
• **Digital Passport** [$3.99] • **Digital Compass** [free] • **Digital Bytes** [free]	K–12	Communication Collaboration Problem Solving Internet Literacy Critical Thinking Digital Citizenship Internet Safety Social-Emotional Competencies	Students and their families are guided through several interactive activities that address internet safety, privacy and security, relationships and communication, cyberbullying and digital drama, digital footprint and reputation, self-image and identity, information literacy, and creative credit and copyright. Students, parents, teachers, and policymakers access unbiased information on books, videos, TV shows, apps, movies, and other media. Students use innovative tools to help them harness the power of media and technology.
Digital Citizenship Curriculum	K–12	Communication Collaboration Problem Solving Digital Citizenship Internet Safety Social-Emotional Competencies	There are 80 lessons in the full K–12 curriculum, with supporting materials such as student handouts, assessments, educational videos, family tip sheets, and professional development resources. The Scope & Sequence consists of three units for Grades K–2, 3–5, and 6–8, and four units for Grades 9–12. Each unit is comprised of five lessons, which spiral to address a cross-curricular approach. The units build on each other by reinforcing developmentally appropriate topics.
Board Builder	K–12	Communication Collaboration Critical Thinking Creativity Basic Literacy	Once students have accounts, logins, and passwords, they can access, post digital content, and curate a huge variety of media and digital tools to activate their curiosity and learning, including videos on thousands of topics and interactive learning experiences with special guest speakers.
Library of Congress Digital Collections [free]	K–12	Communication Collaboration Critical Thinking Creativity Media Literacy	A repository of photos, documents, audio, and video. Students can examine media that promote wondering and develop a process to solve a mystery or seek resources to develop ideas.
Pics4Learning [free]	K–12	Communication Collaboration Critical Thinking Creativity Media Literacy	With these categorized, roylaty-free photographs for educational, teachers can that promote students' wondering and their developing a process to solve a mystery, among other uses.
QuadBlogging	2–12	Communication Collaboration Critical Thinking Creativity Global Learning Media Literacy	QuadBlogging connects a classroom with three other classes, matching preferences selected in the sign-up process. As a group of four, each week, a different class will be the focus class allowing the other three classes to visit and comment on the focus class blog. Over a cycle of 4 weeks, each class has its week as the focus class.

Apps, Websites and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
ReadWriteThink.org	K–12	Communication Collaboration Critical Thinking Creativity Motivational Competency	According to its website, ReadWriteThink's "mission is to provide educators, parents, and after-school professionals with access to the highest quality practices in reading and language arts instruction by offering the very best in free materials." "Every lesson plan on ReadWriteThink has been aligned not only to the IRA/NCTE Standards for the English Language Arts but to individual state standards and Common Core State Standards, when applicable." Students can engage in online literacy learning through interactive tools that help them accomplish a variety of goals—from organizing their thoughts to learning about language—all while having fun.
TeachersFirst	K–12	Communication Collaboration Critical Thinking Creativity Basic Literacy	TeachersFirst is a collection of lessons, units, and web resources designed to save teachers time by delivering just what they need in a practical, user-friendly, and ad-free format. Busy teachers, parents, and students can find resources using robust search tools.
VoiceThread	2–12	Communication Collaboration Critical Thinking Creativity	Students join in a conversation on any topic with teachers, peers, and/or experts in the field, developing a voice for questioning, reflecting, collaborating, and sharing

iPads and Personalization: The Lower Grades

Many pre-K through second-grade teachers who do not have access to 1:1 iPads incorporate the use of shared carts of the devices in centers or workstations that are positioned throughout the classroom. Containing 10–20 devices equipped with a variety of apps targeting related skills sets to allow a better match of student to app, these carts are often shared among several classes, with each child having access to a device at least several times a week. Pennsylvania kindergarten teacher Deena Cross uses a rotation system, in which she presents a quick mini lesson introducing a skill or app within the context of the curricular content being taught. It's a "what-to-do, how-to-do-it session, with many of the children already knowing it, or they ask each other if they don't know something," Deena states. Hers is a balanced program, with the iPad used for reinforcement through fun, imaginative apps; but it is "not something that has to be done everyday by every child." Guided by the teacher to those apps that he or she needs at that specific moment, and equipped with earphones so that no matter how entertainingly raucous it gets, children can pursue their favorite apps: Little Matchups and Starfall ABCs; Doodle-Buddy; and PuppetPals. "Most of the apps on the iPads give immediate feedback to the students and are self-correcting," Mrs. Cross adds. "The students know that they are never finished, that there is always something to do. Kids absolutely love it!" Linking to sites like PebbleGo and BrainPop Videos via the school's It's Learning VLE, parents and their children can explore some of the curricular content at home together, thus flipping the Kindergarten classroom and directly involving parents in the curricular goals.

Kids teaching kids is an effective means of providing personalization when class size or availability of technology is an issue. Second-grade students in Barbara Cipolloni's class, in their study of dinosaurs, use their shared cart of 18 iPads during regularly scheduled times. After reading nonfiction digital and print texts about dinosaurs, creating scaled chalk drawings and measuring the larger-than-life dinosaurs on the pavement outside, and reading Dinosaur Dances by Jane Yolan, the second graders draw pictures of fancifully dressed dinosaurs and write couplets about them. Fifth graders, equipped with their own iPads, and already adept at using the ChatterPix

app through their presentation of research and writing on everything in their curriculum from Chinese fans to civil rights leaders, join the 2nd graders to complete the dinosaur project. Once the artistic renderings are photographed with the iPads, the 5th graders introduce the ChatterPix app that makes photographs speak, and voila, all are impressed with their "talking" dinosaurs. Second graders receive individualized attention from their older "buddies" in the completion of the task, providing both groups with pride in their accomplishments. Teachers look on, noting the communication skills, empathy, patience, resilience, and creativity of their respective students while they are so enthusiastically engaged in their work.

Storytelling opportunities abound in K–2 classrooms and can unfold in a digital manner as early as kindergarten with apps like ChatterPix, Sock Puppets, Puppet PalsHD, Educreations, Explain Everything, and any voiceover or voice-to-text/text-to-voice apps.

iPad apps provide scaffolding for the emerging and beginning readers as they learn to decode their world. Using shared carts of iPads, kindergarteners through second graders, in a balance between screen time and off-screen activities, learn how to use the technology as a tool to compute, explore, decode, comprehend, communicate, collaborate and share, gaining the essentials of reading, visual literacy, digital storytelling, basic coding, Internet literacy and digital citizenship in lessons crafted to meet their developmental needs and individual interests.

iPads and Personalization: The Intermediate Grades

Twenty-first century learning demands that skills be taught in authentic environments in which students take more control of their learning. As children move into the intermediate grade levels, a gradual release of responsibility can occur and more personalized student-driven learning can be fostered. When each child is equipped with a personal learning device, content can be delivered, and skills and strategies involved in reading comprehension, communication, and collaboration can be introduced and reinforced in multiple ways. Literacy programs, infused with multimedia apps and web-based activities and readily accessible when a student needs them, often motivate and enable children to read more, make deeper connections to the text, and more fully response to their reading and research in creative and expository compositions. Using and producing multimedia through apps such as ChatterPix and PhotoBomb (see above), with which students make their original stories come to life with animation, often create magic in the classroom, allowing students to reveal their quirky, whimsical, creative sides, as well as their capacity to comprehend and to compose visual stories.

Providing students with meaningful supplemental texts, images, animations, videos, simulations, music and sounds through SMART lessons, PowerPoint, Keynote, or Prezi presentations, links to YouTube or any number of relevant websites on the content or skill taught is extremely effective in helping students visualize the material they are reading. In a curated forum like a Blackboard, a visual learning environment, iTunes U course, or class website, this kind of visual and auditory support is imperative for many of today's learners, elucidating contextual clues and virtual experiential background, the all-important prior knowledge, that some just do not have. Auditory learners who can hear unfamiliar words pronounced properly or with an inflection that adds meaning benefit immensely. Tactile/kinesthetic learners who can tap and move about the screen for additional information, videos, interactive charts, and animations, or dance to the rhythm of the vocabulary they're learning find the support they need with multimedia.

 Active reading strategies are bolstered when experiencing a novel on a digital device by the interactivity it affords: the capacity to look up unfamiliar words with a simple tap of the keyboard, take notes, highlight important passages for later reflection, or to search for and re-read specific passages for clarification or crucial facts about the setting, character, or plot. As part of the online course created by Susan Hunsinger-Hoff for 5th-grade students about the Civil Rights Movement of the 1950s and 1960s, students read the novel *The Watsons Go to Birmingham, 1963* (Curtis, 1995), enabling them to make deeper connections with the text and gains in comprehension skills and strategies. During the reading, students who are not familiar with the poetry of Langston

Hughes, discussed in an early chapter, are directed to poets.org [free] or to YouTube audio [free] at to listen to Hughes explain the inspiration of his poem "The Negro Speaks of Rivers" and read it. Students who have no idea what the characters in the story are hearing in the songs "Under the Boardwalk" or "Yakety Yak" can listen to the music via YouTube, and those who cannot visualize the journey of this African-American family, in miles and in cultures, from Flint, Michigan, to Birmingham, Alabama, in 1963 can take a virtual tour of the geography with videos, timelines, and images of the various places and events through teacher-created Google Lit Trips. Directing students to the thousands of brief video clips on all curricular topics at Discovery Education can help clear up confusion when reading or searching for information. This form of multisensory engagement with the text enables deeper personal connections and meaning making, furthers questioning and reflection, enlivens conversations, and can produce insightful and comprehensive of evidence of learning through student demonstrations. Through discussions in class and online, students and teachers are able to exchange questions about and reactions to a passage, poem, picture, music or video, giving feedback to each other.

Global connections beyond in the classroom can enhance literacy learning experiences. Employing Skype [various pricing], teachers can connect their students to authors, researchers, experts, museum curators, and students in faraway classrooms. Video conferences and participation in projects such as One World Classrooms can help broaden students' view of the world as they communicate, collaborate, solve problems, and create with others.

Students in the intermediate grades enjoy Kidblog [various pricing] as a means of posting their reflections and opinions about their reading and research. Fifth graders in Fort Washington, PA employ Kidblog for a year-long project wherein children read independently as many books as they can and post reactions to what they're reading. Students across all classes in the grade have access to each other's posts, and comment on the novels, thereby creating a virtual book club that is populated and enjoyed in and outside of school. The amount of reading the students accomplish and the quality of the expression of their thinking about the books, prompted by questions from their peers, increase exponentially as this forum takes hold each year. Kidblog can be utilized as a forum for creative writing, book clubs, math problem solving, science notebooks, global pen pals, and can be added to students' digital portfolios.

Finding interesting, relevant, appropriate material for each student can be challenging for a teacher who is dedicated to personalization, but with the wealth of materials available today, it is now possible. Teachers need the freedom to use everything they can find to motivate reluctant readers to engage more with given texts. The highly-entertaining Sports Illustrated Kids [$19.95/year] magazine, available in a digital subscription for a more interactive engagement with the text, has been used successfully to teach decoding, vocabulary, critical thinking, media literacy, reading for information, and as motivation for expository, persuasive, and creative writing. Graphic fiction apps, like Comics – Read Comic Books, Graphic Novels & Manga, [free app; content pricing varies], provide the means to share reactions to the reading through the app, Halftone2 Comic Book Creator [$2.99] have found their way into classrooms as a means to motivate, engage, and foster a lifelong love of reading in many reluctant readers.

The institution of a 1:1 iPad program was highly motivating for a group of 70 fifth graders at Germantown Academy in Washington, PA, last spring as they prepared for their annual culminating presentation of the unit Our Endangered Earth. Forest Fest, as the multidisciplinary, multimedia production is called, begins with Internet inquiry tasks. Motivated to learn about the most up-to-date threats to the rainforests of the Pacific Northwest and the Amazon, and what it will take to save them, students research extensively, with a constant exchange of findings among students, teachers, and experts. Students reach out to authors, naturalists, scientists, environmental agencies and organizations via Google Docs, Skype, and the school's It's Learning virtual learning community. iPads are used throughout the research and the process of drafting, writing, revising and editing poetry, scripts, song lyrics, and raps, and the capturing, recording, and editing of student-created music, nature claymations using Frames and StopMotionStudio, and the production of iPhoto slide shows, iMovies, and iMovie Trailers. Forest Fest is authentic performance assessment at its best, highlighting the multiple intelligences and talents of each student in the grade.

Learning communication, collaboration, critical thinking/problem solving, and developing creative skills takes

many forms in middle grade classrooms, and most of the aforementioned activities can used for literacy learning in middle school-aged children. Meeting pre- and early adolescent learners at their interest level and providing them with opportunities to explore topics of interest to them through means that make sense to them make a huge difference in their motivation to learn and ownership of their learning. Today's middle schoolers can often be seen busily creating and playing video games, manipulating multimedia, and actively engaging in social media networks, all causing literacy classes to become hubs of creativity filled with the excitement of learning.

Zach Posnan has initiated a coding program at his school in suburban Philadelphia as early as 4th grade "because the children are so engaged in it! It's like playing a video game." Utilizing the **Hour of Code** website, students create a maze with a pig and a familiar angry bird that chases it, great fun for them while learning reasoning, perseverance, logic, and critical thinking. In this program, "every time you accomplish an important task, you are shown a two-minute video created by a celebrity, giving the activity such a real world connection," adds Posnan. Some students showing a proclivity towards coding have created several games using the **Hopscotch** app. Such tools provide interested potential coders without prior experience the basics of programming and problem solving.

In addition to being fun, motivating, and engaging, coding, games, and gamification (the use of game thinking and game mechanics in non-game contexts to engage users in solving problems and increase users' contributions) teach life skills of grit, persistence, and logical reasoning (Kapp, 2016). Richard Culatta, former director of the Office of Educational Technology, U.S. Department of Education, who is passionate about accelerating innovation in education, has long held the notion that games are powerful tools in personalizing learning. According to Culatta (2010), all games teach something. Games give learners choice, are customized to the needs of the people engaging in them, provide opportunities in nonlinear thinking, are used in cognitive psychology as a means to help students discover what they can do alone, what they can do with help, and what they can't do. They help students understand how to leverage failure for learning, immerse the learner in context, provide means for real problem solving, make data much more intriguing, and are more fun, as in "mastery = fun," with encouragement, surprises and collaboration built in. Innovative teachers in the intermediate grades use games to teach 21st-century life skills, including the communication, collaboration, creativity, and critical thinking.

How students communicate their knowledge changes dramatically when online publishing and multimedia apps on iPads are used in the intermediate grades. Explaining how they solved a problem, designed a new game, or interpreted factual or fictional readings, students are much more expressive when they have a variety of media at their fingertips. Even the old book report is transformed into a dynamic sharing of one's reading, with the use of multimedia and the Internet, as seen in one fifth-grade student's creative analysis of a novel. Because of her advanced literacy ability, she chose to read (with teacher and parental approval) an adult novel to supplement her history study of World War II. Using a web-creation **tool** to post her report on the novel, she included music, images, and original poetry to add impact to the expository writing describing character, setting, and plot.

During the study of the novel *The Great Wide Sea* (Herlong, 2008), middle school students in Andrew Dolan's classes at Germantown Academy in Fort Washington, PA, use the iPhone Fake-a-Text app when analyzing characterization. This app that simulates texting enables the students imagine, supported by the text, text messages characters might send. Using their iPads and QR codes to share mini reviews on the books they're reading, students are motivated to find more books they would like to read based on the recommendations of their peers. To personalize his program even more, Mr. Dolan allows students a two-month stretch with no required book, allowing the students to choose their books and challenging themselves to see how many they can read. Devoting some class time each day, students can choose to read or write, the only stipulation being that they read something that interests them. "Engagement is so high during this time," Dolan explains. While some students are involved with their reading and journaling, the teacher takes small groups to find textual evidence, which students record using a drawing app like **Sketch Club** [$2.99], or students take a selfie and draw bubbles of thoughts that depict their thinking. Some students find they have an affinity to the antagonist once they created character conversations and mind maps using concept-mapping tools. Finding textual evidence becomes much more interesting because they are using the iPad. Using the popular Minecraft game to re-create the world in the books helps them to a deeper connection to setting, characterization, problem, and plot. "Students read more

than they ever had read before," claims Dolan, "completing interesting open-ended projects using their iPads to share their reactions."

Many teachers encourage the use of apps like Voki, InfoGraphic and Poster Creator–Graphic Maker, BiblioNasium, and Glogster for students to organize and publish their reactions to literature or to present their research as infographics or multimedia digital posters. This is not simply digitizing the text, but deepening the connections that students make with the text, whether it is fictional or informative, and with each other as they share. Students in the middle grades are thrilled to demonstrate what they've learned through QR codes that link to their multimedia presentations via the QR code maker/scanner/reader apps on their iPads, making the search for additional information an absorbing scavenger hunt for their peers.

Within appropriate parameters modeled by the teacher and ongoing integrated lessons in good citizenship in the real and the digital world, middle school teachers have found that online communication gives each student a voice. Furthermore, students take others' recommendations, thus becoming an integral part of each other's learning. Given students' deep involvement in social networking, these opportunities in and out of school result in middle school students writing extensively—many of them setting up personal blogs and commenting at length about their readings.

Capitalizing on early adolescent students' fascination with and time-consuming use of social networking, many teachers build into their curriculum the "tools of the students' trade." Using apps like **PicCollage** [free; in-app purchases], **Instagram**, and **Pic Stitch** [free; in-app purchases], teachers and students can present and share creative content on any number of topics, for creative compositions in the middle grades can take many forms. Blogs, wikis, fanfic writing, manga, meme-ing, photoshopping, anime music videos, podcasting, vodcasting, and gaming are all geared to 21st-century skills; they complement the skills required of reading of novels, short stories, poetry and nonfiction, and note-taking, essay and creative writing, and class presentations. The new social media skills also provide ample opportunities to teach the metacognitive skills of planning and executing projects, critical skills in analyzing and drawing conclusions. In fact, the "fear of missing out (FoMO) phenomenon" directly challenges metacognitive skills "because it challenges self-regulation in both teens and adults" (Nicdoli, 2015). Questions like the following must be pursued relentlessly when addressing social media in the middle grades: What are the different purposes of media messages? What techniques are used to attract the attention of a reader, listener, or viewer? What clues suggest the target audience for different types of media messages? What questions are important when watching TV, listening, or reading to become an active media consumer? What digital citizenship practices (digital footprint and reputation, creative credit and copyright) must we be mindful of when becoming producers of media?"

Furthermore, because social media is the means through which students brand themselves and perceive others, their learning of appropriate social-emotional skills can not overlooked. Those integral components of digital citizenship, relationships and communication, cyberbullying, and self-image and identity, as described in the **Common Sense Media** framework, must be addressed honestly and thoroughly. All children want to be loved and respected, and most feel a need to be accepted by their peers. Demystifying the digital reputations that adolescents often associate with the number of "likes" on any of their posts on social media sites is imperative in classrooms embracing 21st-century tools and resources.

iPads and Personalization: The Upper Grades

Education is asking us to teach our students to create their own questions, do their own research, form their own conclusions with their learning, work well with others, and share their thinking to wide audiences beyond the classroom, all while developing their digital footprints or legacies online. With a strong foundation in communication, collaboration, critical thinking, and creativity in the years leading up to high

school, students in these grades are better equipped to design and pursue their own learning paths. Student-driven problem- or project-based content delivered via virtual environments is readily attained once students know enough about what's "in the box" to be able to think outside of it. Armed with their digital devices, the sky is the limit for high school students to pursue problem-based learning projects on a local or global scale on highly motivating themes, such as health, wellness, body image, gender identity, personal finances, environmental issues, social injustice, sports medicine—all while gaining the 21st-century skills needed for success in the future.

However, in many high schools committed to a curriculum with lists of required texts that have been in place since the 19th Century, being permitted to or being offered the opportunity to determine and follow one's own learning path remains a serious challenge. It is often extremely difficult to generate enthusiasm for deep engagement with classic texts or to tap the intrinsic motivation and curiosity of teenagers who attend schools still tied to the curricular standards and assessments of the past. Some innovative teachers take a different tack.

High school English classes, where students once struggled with the reading of Shakespeare, have been transformed by podcasting technology. Students at Mount St. Joseph Academy in Philadelphia, PA, at San Luis Obispo and Morro Bay High Schools, both in California, and at many other schools throughout the country, who have attempted to read *Hamlet*, long an essential text in their classes, have turned to the use of the very popular *Serial* podcast, a *This American Life* spinoff, as one of their class's primary texts. California teacher Michael Godsey's decision was inspired partly by the Common Core State Standards, which, among other things, emphasize critical thinking skills and call for many high school teachers to incorporate more nonfiction into the classroom. Godsey's move speaks to both the greatest fears and hopes surrounding the controversial curriculum standards. The introduction of *Serial* has reinvigorated the class, according to Godsey and his students, eliciting critical thought and igniting interest in all sorts of literary devices. He explains, "In a way, *Serial* is about as Shakespearean as a story can get: You've got young lovers whose families don't approve of their relationship. There's a backstabbing friend. And it's all built around the investigation of a mysterious death, though in this case it's veteran reporter Sarah Koenig doing the poking around, not an increasingly unstable Prince Hamlet." Serial unspools its story in the conversational language students use every day but still gives Godsey a chance to address the same literacy skills as he would with Shakespeare: characters, narrators' reliability, story structure, and foreshadowing.[1]

Charter schools, like San Diego's High Tech High, which replaces standardized tests and compartmentalized subjects with project-based learning and a student-focused curriculum, offer an alternative to traditional instruction. The documentary film *Most Likely to Succeed* (Whiteley, 2014) follows students, teachers, and parents to see if this different model can reawaken the love of learning and offer the potential for a paradigmatic shift in education. Exploring alternative ways of schooling, specifically the model developed at High Tech High, the film does not offer a prescription, but it criticizes the old model of rows of compliant students regurgitating facts and celebrates active engagement, challenging work, and authentic project-based demonstrations of learning.

Our challenge today is to prepare our students for tomorrow, a tomorrow that will require them to master technologies that don't yet exist. It is difficult to imagine what the world will be like for today's elementary school children who will be entering the prime of their careers in the 2040s, or even for today's high school graduates when they leave college in 2019 or 2020. Therefore, it is crucial to develop timeless skills such as curiosity, creativity, resilience, persistence, and the motivation and ability to learn on one's own.

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[1] Editor's note: In substituting the study of the podcast for *Hamlet*, Godsey forgoes the teaching of masterwork of world literature—and opportunities for engaging students in discussions of Renaissance history and culture, language change, and some of the most enduring passages in English—for something probably ephemeral. Also, because state and local curricula often mandate the teaching of Shakespeare, a better tactic might be to use one of the facing-page modern English translations, available online and free (e.g., Crowther, 2015), in combination with one of the many film productions of the plays now available in digital formats.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Audacity	3–12	Communication Collaboration Basic Literacy Creativity	Students write script, practice speaking, record their voices, and add music to their narrative creations. Files can be uploaded as podcasts
BiblioNasium	K–8	Communication Collaboration Basic Literacy	Students learn good reading habits at a young age, to view reading as a social activity, and to connect with other students, parents and teachers to create a virtual "reading village." Students contribute to digital reading logs, find books they might want to read, and share their reactions on the site.
Blackboard	5–12	Communication Collaboration Assessment	Students access this content management system for lessons, tutorials, assignments, assessments, school communications, collaborative projects, etc. that personalize their learning.
• BrainPop, Jr. • BrainPop ESL	K–5	Basic Literacy	Students are directed to watch animations and videos on topics that interest them or that address the skills they need to practice.
• Bugs and Bubbles [$2.99] • Bugs and Buttons [$2.99] • Bugs and Numbers [$2.99]	K	Motivation Basic Literacy	Students listen to stories independently.
ChatterPix [free]	2–12	Basic Literacy (writing) Motivational Communication Collaboration Creativity Formative & Summative Assessment	Students give voice to their writing and research by creating poetry or dialogue that makes their photos of dinosaurs, Chinese fans, or any aspect of their studies "talk."
ClassDojo	K–12	Communication	Teachers and parents help children learn important soft skills, such as grit and curiosity. ClassDojo is a classroom management tool and behavior tracker.
Classkick [free]	2–12	Communication Collaboration Creativity Critical Thinking Problem Solving Social/Emotional Competency Formative & Summative Assessment	Students work assignments on their iPad. Teachers create assignments, see all their students' work in real-time, and give instantaneous feedback. Students can help each other anonymously.
• Comic Creator • ComicBook! [$2.99] • Strip Designer [$2.99] • Comic Maker [free] • Comic Life [$4.99] • Toontastic [free]	3–12 1–5	Basic Literacy Media Skills Creativity Communication Collaboration Social-Emotional Competency Motivational Competency	Students create comic stories and sequences to illustrate and share their understanding of concepts, digital storytelling ideas, narratives, novel study, science experiments, etc.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Comics-Read Comic Books, Graphic Novels, and Manga [app free; in-app purchases of comics]	5–12	Basic Literacy Motivational Competency Media Literacy	Students access this free app to read comic books, graphic novels, and manga purchased. They can search their library using smart lists and sorting options. Students experience cinematic, immersive reading that lets them easily scan, zoom, and flip pages.
Doodle Buddy [free]	K–2	Basic literacy Creativity Communication	Artistic visual learners create drawings and tell stories through finger painting.
Dragon Dictation	K–12	Communication Basic Literacy Assessment	Students dictate their thoughts, and their words are transformed into text. Students practice their reading fluency, take notes, record their pre-writing brainstorms, etc.
Dropbox	2–12	Communication Collaboration Assessment	Students and teachers store, sync, and share files securely.
Easy Blogger, Jr. [$5.99]	K–4	Creativity Communication Collaboration Assessment	Students share their ideas in a safe, closed environment through a straightforward blogging vehicle.
EduBlogs	2–12	Creativity Basic Literacy Communication Collaboration Assessment Social/Emotional Competency Digital Citizenship	Students share their ideas in a safe, closed environment through a straightforward blogging vehicle.
EssayMap	3–12	Basic Literacy Creativity Communication Collaboration Assessment	Students use an interactive graphic organizer that enables them to brainstorm, organize and outline their ideas composing informational, definitional, or descriptive texts.
Evernote	3–12	Basic Literacy Communication Media Literacy	Students take notes on any topic.
Explain Everything	K–12	Communication Collaboration Motivational Competency Metacognitive Competency Social/Emotional Competency	Students communicate, submitting their thoughts, writing, multimedia projects, etc. and collaborating with peers, receiving feedback from classmates and teachers. Workflow.
Fake-A-Text	6–12	Communication Creativity Motivational Competency Social Media Literacy	Students create fake conversations between characters in novels, historical figures, etc., that have the look and feel of text messages.
Frames	4–12	Communication Collaboration Creativity Motivational Competency	Students create claymation, stop-motion, and original cartoons in order to produce digital creative writing, reactions to their reading, or the results of their information searches.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
GarageBand [$4.99]	2–12	Communication Collaboration Basic Literacy Creativity Motivational Competency Metacognitive Competency Social/Emotional Competency	Students play, mix, and record their own songs or voices, creating music and sounds that express their digital stories. GB files can be uploaded readily to movies or as stand alone as podcasts to reach a wide audience.
Glogster	3–12	Basic Literacy Communication Motivational Competency Media Research Skills Assessment	Students choose topics and design and publish interactive posters to organize, demonstrate, and share their learning.
Google Apps for Education	K–12	Creativity Communication Collaboration Assessment	Students learn content and the skills to communicate, collaborate, and create in a digital world through a variety of apps.
Halftone 2—Comic Book Creator [$2.99]	6–12	Communication Creativity Assessment Motivational Competency	Students transform their photos into comic book pages and videos.
Hands On Equations	3–6	Critical Thinking Problem solving Logical Reasoning	Students work interactive pre-algebra manipulatives at their own pace, showing/recording their thought processes as they proceed through the course.
Hopscotch [free]	2–12	Critical Thinking Problem Solving Creativity Communication Collaboration Logical Reasoning	Students create their own video games via basic coding. They can publish them for others to play.
Hour of Code	2–12	Critical Thinking Problem Solving Creativity Communication Collaboration Cognitive Competency	Students engage in offline and online activities in which they examine how computer science impacts lives and how to write code.
I Like Books [$1.99]	K–1	Motivational Competency Basic Literacy	Students listen to and interact with stories independently, supporting reading and vocabulary development.
iMovie [$4.99]	K–12	Communication Collaboration Creativity Critical Thinking Media Skills Assessment Metacognitive Competency Social/emotional Competency Motivational Competency	Students create video reports—using pictures, text, sound—to demonstrate their comprehension of abstract concepts and to share what they are reading, perhaps to motivate others to learn what they've discovered. Students create digital stories, and document, record, and share events occurring outside of the classroom. Teachers can create a how-to demonstration or other instruction for classroom or blended learning courses.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
InfoGraphic and Poster Creator - Graphic Maker [$2.99]	5–12	Communication Collaboration Creativity Critical Thinking Assessment	Students create graphics, flyers, logos, and infographics, demonstrating their sense of design, and showing what they know about any topic assigned.
Instagram [free]	6–12	Visual Literacy Communication Collaboration Creativity Social Media Literacy	Students capture, edit, and share their photos and videos.
iTunes Podcasts	K–12	Communication Cognitive Competency	Students download and listen to recordings on a variety of topics.
iTunes U	K–12	Basic Literacy Communication Collaboration Creativity Critical Thinking Assessment	Students access apps, books, videos, music, podcasts, and primary sources from across iTunes. Teachers create and deliver multimedia lessons and tutorials on any topic. Students can submit their work directly from supported apps to an assignment in iTunes U. Projects are all organized in one place, making them readily accessible to review and grade.
Khan Academy [free]	K–12	Cognitive Competency Basic Literacy Communication Collaboration Critical Thinking Creativity	Students engage in online multimedia tutorials on a multitude of topics to reinforce learning of literacy skills in a personalized manner.
Keynote [$9.99]	3–12	Communication Collaboration Creativity Critical Thinking Assessment	Students organize their thinking, research, and writing and demonstrate their learning by creating dynamic multimedia presentations.
KidBlog [$39.00 per school year]	K–12	Communication Collaboration Creativity Critical Thinking Basic Literacy Social/Emotional Competency Motivational Competency	Kidblog gives students' writing motivation and purpose with an authentic audience of peers and a place to publish safely online. They engage with a global network and exercise digital citizenship within a secure classroom blogging space. Teachers can monitor all activity within their blogging community.
LetterSchool Free [free, with $4.99 for full version]	K–1	Basic Literacy	An app for handwriting practice.
LittleBits [prices vary]	K–12	Critical Thinking Problem Solving Collaboration Creativity Cognitive Competency	Students tinker in learning-by-design makerspaces.
Little Matchups [$0.99]	pre-K	Basic Literacy Cognitive Competency	Students work in skill- or content-specific centers, focusing on object shapes, letters, word recognition, and phonemic awareness. An individual or small group is directed by the teacher to work at their own pace using an app that is motivating to them.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Makerspace Playbook [2nd ed., 2013]	K–12	Communication Collaboration Creativity Critical Thinking Problem Solving Self-Assessment	Makerspaces are learning environments that serve as gathering points for tools, projects, mentors, and expertise. Students tinker with the materials and use the resources available in the "space" to discover solutions to problems and to create objects.
meMatic [free, with in-app purchases]	6–12	Communication Creativity Basic Literacy	Students add captions to their photos or popular images to create memes.
Nearpod	K–12	Communication Collaboration Assessment	Teachers, schools and districts use their iPads to manage content on students' Apple devices. It seamlessly integrates interactive presentation, collaboration, and real-time assessment tools.
Notability [$7.99]	3–12	Basic Literacy Communication Media Skills	Students take notes, organizing and storing information on any topic for ready access from any of their devices.
Google Keep [free]	3–2	Basic Literacy Communication Media Skills	Students take notes, organizing and storing information on any topic for ready access from any of their devices.
One More Story [free, with in-app purchases]	K–2	Motivational Competency Basic Literacy	Students listen to multimedia stories independently.
OneWorld Classrooms	K–12	Communication Collaboration Critical Thinking Creativity Cognitive Competency Social/emotional Competency	Students engage in projects and conversations with global communities through regular opportunities to connect with their global peers in every area of the curriculum.
Padlet [free]	K–12	Communication Collaboration Basic Literacy Formative assessment Critical Thinking Creativity Social/emotional Competency	Students collaborate by posting a problem, answers to questions, ideas on any topic to the board, and can add videos and other media to complete their creations. Padlets can be used for chats, blogs, feedback, bulletin boards, knowledge bases, forums, wikis, photo albums, creative writing, diaries, etc., and can be readily share in a closed, safe environment.
Pages [$19.99]	K–12	Communication Collaboration Creativity Basic Literacy	This Apple program enables students to show their learning through word processing and the addition of multimedia to their presentations.
PebbleGo [pricing per database subscription, starting at $399 for one database]	K–3	Reading Communication Metacognitive Competency Cognitive Competency	Emergent readers use up to six databases to research information on animals, science, dinosaurs, biographies, social studies etc. One database on animals in Spanish.
PicCollage for Kids PicCollage [both free apps, with in-app purchases]	2–8 9–12	Communication Collaboration Basic Literacy Media Skills	Students create photo collages on any topic that are easily shared via email or text messages.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Pixie [$9.99]	K–5	Communication Collaboration Creativity Basic Literacy Assessment	Students use this authoring tool to share ideas and understanding through a combination of text, original artwork, voice narration, and images. Students can use the paint tools, text options, clip art, and voice recording to develop storybooks, curriculum projects, videos, etc.
Pocket Charts! Pro [$4.99]	K–1	Basic Literacy Motivational Competency	Students access 21 pocket chart activities on their iPads, giving them a fun way to practice adding and subtracting, sorting blends and digraphs, matching positional words to picture, spelling 3-letter words, combining images to build compound words. The youngest iPad users can engage in early learning activities including counting, sorting, matching colors, shapes, etc.
• PortfolioGen • Easy Portfolio [$1.99]	9–12 K–12	Creativity Basic Literacy Communication Collaboration Creativity Critical Thinking Formative and Summative Assessment Metacognitive Competency Social/Emotional Competency	Students create and are guided to curate artifacts that demonstrate what they are proud of, what challenges they've overcome, what they have learned about themselves, others, and their world. Photo and videos, audio recordings or music files, web links to online work, text entries/observations, digital documents direct from Dropbox or email, can all be placed in the students' digital portfolios
Prezi [14-day free trial, after which pricing varies, from $4.92/mo. to $20.00/mo.]	3–12	Communication Collaboration Creativity Critical Thinking Metacognitive Competency	Students organize their thinking, research, and writing and demonstrate their learning by creating dynamic multimedia presentations.
Puffin Academy [free]	K–12	Communication Critical Thinking Basic Literacy Creativity	This is mobile Flash browser for students, parents, and teachers; it enables Adobe Flash-based educational websites, like Voki, to run on the iOS platform.
Puppet Pals HD	K–4	Basic Literacy Communication	Students create their own stories and present them in "puppet shows" with animation and audio.
Qrafter	6–12	Communication Collaboration Critical Thinking Summative Assessment	Students create QR codes that link to their work to share with others.
ReadWriteThink.org	K–12	Basic Literacy Communication Collaboration Formative and Summative Assessment	On this NCTE-sponsored site, students apply multimedia, interactive tools to post questions, find information, compose poetry and prose, organize ideas in concept maps, and demonstrate learning.
Rhyming Words [$0.99]	K	Basic Literacy	Students work with shapes and letter recognition, phonemic awareness, alphabet activities, and words. For individuals or small groups, the teacher directs students to work at their own pace.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Rover [free, and $9.99] Photon Flash Player for iPad [$4.99]	K–12	Basic Literacy Communication	Running a Flash-driven interactive through Rover or Photon enables the site to work on an iPad.
• Scratch, Jr. • Scratch	K–12	Creativity Collaboration Metacognitive Competency	Students use simple coding to program their own interactive stories, games, and animations, and share their creations with others in the online community.
This American Life	9–12	Literacy	Students can analyze components of fiction presented in engaging, narrative podcasts.
SMART Technologies [various products and pricing]	K–12	Communication Collaboration Creativity Problem Solving Critical Thinking Basic Literacy Metacognitive Competency	A variety of hardware (whiteboards) and software enabling teachers to create interactive, multimedia lessons; and students participate in school and at home.
SnapApp	6–12	Communication Collaboration Creativity Basic Literacy Assessment	Students use a wide array of content templates, drag and drop design, workflow management, and analytics to create and share content on any topic.
Sock Puppets [free, with in-app purchases]	K–8	Creativity Basic Literacy Collaboration	Students create their own lip-synched videos and share them.
Starfall	K–1	Basic Literacy	Students work on shape and letter recognition, phonemic awareness, alphabet and word activities. Teachers direct individuals or small groups to work at their own pace.
Stop Motion Studio [free, with in-app purchases]	4–12	Communication Collaboration Creativity Basic Literacy Media Skills Critical Thinking Metacognitive Competency	Students create stop-motion movies as a means of digital storytelling. The app enables students to add video, sound, voice, music, photos and texts as they create animations, claymations, or presentations of what they've learned or seen.
StoryBuilder [$7.99]	K–8	Basic Literacy Communication Collaboration Creativity Cognitive Competency Metacognitive Competency	Students answer questions that guide the creation of narrative, working toward improving paragraph formation, integration of ideas, and higher level abstractions by inference. Extensive use of audio clips promotes improved auditory processing for special needs children with autism spectrum disorders or sensory processing disorders.
StoryKit [free]	K–12	Basic Literacy Collaboration Summative Assessment Metacognitive Competency	Students and families create electronic storybooks. Students can illustrate their stories by drawing on the screen, taking a photograph of something they see, or by drawing on paper and then photographing the paper, or by attaching photos from their albums. Sounds can be recorded for telling the story or as sound effects.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
Tagxedo	K–12	Creativity Critical Thinking Communication Formative and Summative Assessment Metacognitive Competency	Students practice higher order thinking skills by brainstorming, analyzing, categorizing, and organizing ideas into creative concept maps.
Teach Your Monster to Read	K–1	Basic Literacy Formative Assessment	Students review letter recognition, phonemes, graphemes, etc. in a game-like platform that provides statistics on what each child is doing. If a child is struggling with a problem, the program leads that child to what he or she needs. Families can be actively involved.
Teleprompter Pro Lite [free]	3–12	Basic Literacy Communication Assessment Media Skills Motivational Competency Social/Emotional Competency	When recording audio and video of their writing, students can read their scripts, sing their lyrics, deliver their speeches, etc. with confidence.
ThingLink [free]	K–12	Basic Literacy Communication Assessment Media Skills Motivational Competency	Students and families create videos and embed speech, music, YouTube videos, giving students who may not be able to write their thoughts down a voice.
Three Ring [free]	9–12	Basic Literacy Communication Collaboration Creativity Critical Thinking Formative and Summative Assessment Metacognitive Competency Social/Emotional Competency	Teachers, students, and administrators document and organize evidence of learning such as speeches, performances, presentations, experiments, text, videos, audio, etc. by individual student portfolio or assignment.
Trading Cards [free]	3–8	Basic Literacy Communication Collaboration Creativity Formative and Summative Assessment	Students use this interactive tool from the International Reading Association to make character trading cards that demonstrate their comprehension, share their understanding of various topics, build study aids, or to create their own fictional world of characters.
TeacherTube	4–12	Cognitive Competency Metacognitive Competency	YouTube videos, organized by academic subject and grade level, can be used for class assignments or personalized learning.
Voki [free]	2–12	Communication Collaboration Creativity Basic Literacy Assessment Cognitive Competency	Students create characters that speak in many languages. They can customize their appearance and what they say, and share with others.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies	Personalization: What It Looks Like in the Classroom
WebStarts [free for basic version]	5–12	Communication Creativity Basic Literacy Media Skills Assessment Metacognitive Competency	Students create their own websites with this tool, building multimedia showcases for their projects and literacy learning.
Webspiration [30-day free trial, then $6/month.]	5–12	Basic Literacy Collaboration Formative Assessment Metacognitive Competency Cognitive Competency	Students brainstorm, categorize, and organize ideas in interactive online graphic organizers. Webspiration provides a safe and reliable online learning environment that helps students improve their reading comprehension, writing, and thinking skills.
Weebly [free for basic version]	5–12	Creativity Basic Literacy Communication Collaboration Critical Thinking Formative and Summative Assessment Metacognitive Competency Social/Emotional Competency	Student-curated multimedia collections of documents and artifacts that demonstrate what they are proud of, what challenges they've overcome, what they are working on, what they have learned about themselves, others, and their world. Students create their own websites, blogs, or online stores.

Assessment

Both formative and summative assessment of student work takes many forms and is usually a part of every lesson, project, or task assigned. Strengths, weaknesses, and gaps in students' knowledge or thinking process become evident when students are encouraged to brainstorm and organize their thinking with the concept mapping tools that work for them. Many graphic organizers listed above (e.g., Kidspiration, Inspiration, Bubbl.us, Popplet, or those at ReadWriteThink.org) are reviewed at TeachersFirst.org and have proven invaluable. They are excellent tools for formative assessment, providing observant teachers insight into the children's thinking and interests, thus enabling teachers to adjust current work or tailor future assignments to individual needs. Graphic organizers can also be effective as a means to plan a "portfolio table of contents" for students who need structure to persist when working through complex concepts.

Teacher-made rubrics are powerful formative assessment tools that can be personalized to fit the needs of every student. Sites such as Rubistar4Teachers can be a tremendous aid for busy teachers who wish to customize these tools. With such rubrics, students can see the standards towards which they are striving and self-assess their work when provided with clear criteria for performance at various levels of achievement.

Digital storytelling also provides a key assessment tool at all levels of literacy instruction. As Porter (2016) asserts, "The digital storytelling process helps us transform isolated facts into illuminated, enduring understandings. By 'living in the story,' we make information come emotionally alive. By exploring 'lessons learned,' we go beyond telling about content to find its deeper meaning." Students using apps like those cited in sections above—StoryKit, Toontastic, VoiceThread, ThingLink, Comic Life, Explain Everything, Padlet, ChatterPix, and iMovie, "show what they know" on any topic, learn much through the process of displaying their work, reflecting on it, and receiving feedback and prompts to further their learning.

Capturing, curating, and sharing evidence of learning is facilitated by the use of iPad functions and apps. Video and audio representation of learning can easily be added to a student's portfolio if it is a digitized collection. From the voice recordings of an emergent reader to visual interactive displays of multimedia book reviews, history reports, creative writing, science experiments, and problem-solving sessions, to full-blown documentaries on student-chosen topics, a student's portfolio becomes a living, dynamic portrayal of how he or she thinks and what he or she can do. Introducing digital portfolios in the early grades enables students to better develop skills related to flexibility, resilience, reflection and self-assessment. Learning to trust that they can be candid about successes and failures, and honest about their need to reflect, rethink, revise, explore further, or scrap a project entirely without retribution, can take time, but formative assessments tools can be powerful assets for 21st-century learning and successful outcome in school and beyond.

Apps, Websites, and Other Digital Resources	Level	21st-Century Skills and Personal Competencies Assessed	Personalization: What It Looks Like in the Classroom
Animoto Video Maker [$8.00/mo. for the basic version]	6–12	Creativity Communication Collaboration Media Skills Social-Emotional Competency Motivational Competency	Students create digital stories in the form of a video to demonstrate their understanding of curricular objectives.
Growing the List: 50 Digital Education Tools and Apps for Formative Assessment Success	2–12	Basic Literacy Communication Collaboration Creativity Formative Assessment Motivational Competency	Teachers access this site for 50 ideas for assessment
Rubistar4teachers	K–12	Formative Assessment Cognitive Competency Metacognitive Competency	Teachers create rubrics with this interactive tool. Rubrics can be created from scratch to meet individual needs or adapted from templates. Templates help assess oral, multimedia, math, science, music, reading, writing, art, and research projects. They address work skills and products, such as making a brochure, game, poster, newspaper, timeline, public awareness campaign, etc. Rubric templates contain levels, criteria, level and success descriptors, that can be individually adjusted.
Rubrics to the Rescue	K–12	Communication Collaboration Creativity Critical Thinking Formative Assessment Motivational Competency	Teachers are provided with an overview of the rationale for using rubrics and tools and tips for implementing rubrics as an assessment tool.
Videolicious [free]	K–12	Creativity Communication Collaboration Critical Thinking Metacognitive Competency	Students can weave together photos, music, videos, interviews, etc., into video productions that demonstrate what they have learned

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About the Author

Susan Hunsinger-Hoff retired from her position as technology coordinator and instructor at Germantown Academy in Fort Washington, PA, in 2014. Her expertise is in technology-assisted teaching and learning strategies. She received her M.Ed. in educational technology from Arcadia University in Glenside, PA. During her 42-year tenure at Germantown Academy, the positions she has held include fifth-grade teacher, technology integration coordinator, divisional technology coordinator, and interdisciplinary studies coordinator.

She she received the Distinguished Teacher Award in 1981 and was designated a Level IV Master Teacher in 1991. She has held many service positions at Germantown Academy, including chairing the Subcommittee on Digital Citizenship and the Social Studies Committee, and serving as lead teacher of the fifth grade. She has received numerous Kast Grants, a professional growth endowment, through which she pursued a variety of topics, including electronic portfolio assessment, skills-based hands-on instruction through interactive whiteboards, digital citizenship, differential math instruction, interdisciplinary American history, literacies in an interdisciplinary curriculum, and the integration of iPads into the curriculum. She has presented at international and national, and local conferences, including the International Society for Technology in Education and the National Staff Development Council.

Susan Hunsinger-Hoff states, "The development of the Internet and the integration of technology and instruction enable me to motivate students to take ownership of their learning, which I love seeing happen. I was among the team who crawled around in the ceilings of our classrooms to do the wiring for our classrooms for our first connection to the Internet. Our first online chat was with Rosa Parks. Observing how motivated students were when working with technology, I decided to return to school to earn my M.Ed. in instructional technology. I am passionate about building curriculum and integrating 21st-century literacies into that curriculum in order to empower our young people to be the best they can be, and to connect effectively, safely, and creatively in their digital world."

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