TECH FOR TEACHERS

APPS, TOOLS AND ONLINE RESOURCES

The ultimate guide for teachers bringing tech into the classroom. Get expert info and advice on today's top educational technology, and find more than 150 online resources organized by subject and age.

ABOUT THE AUTHORS

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Jennifer Koebele has more than a decade of experience researching and writing on topics related to higher education and teaching. She's a former elementary school teacher with a master's degree in education.

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Wes Harris has worked in education for more than a decade. In addition to teaching kindergarten Spanish and lecturing at the college level, he has researched, written and edited more than a dozen nationally recognized works on a variety of educational topics.

EXPERT CONTRIBUTORS

More than a dozen industry experts contributed to the research and writing of this guidebook. Their collective areas of expertise include educational consulting, social work, instructional theory, technology in the classroom, and online learning. A very special thanks to the following contributors:

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INTRODUCTION

Advances in educational technology have changed the way educators teach and shaped the way children learn. As new products continue to be introduced at a rapid pace, teachers are becoming more reliant on it to engage learners and keep them hooked. In a 2013 national survey of pre-K-12 teachers by PBS Learning Media, three-quarters of the teachers claimed educational technology made teaching easier. In addition, 7 in 10 teachers felt educational technology allowed them to "do much more than ever before" for their students.

But for educators, just having the technology at their fingertips is not enough. For technology to be effective there has to be quality content. Teachers need resources that help them utilize technology as a medium for their instruction instead of as the focus, or even worse- a distraction. We've put together more than 150 resources for educators, including popular and up-and-coming classroom technology tools, online resources and apps.

TOOLS OF THE TRADE

CLICKERS (STUDENT RESPONSE SYSTEMS)

Clickers, or student response systems, look like small remote controls. After the instructor prompts the class, students can provide individual instant feedback, answer questions, and submit votes. Responses are automatically sent to the instructor via an identifiable infrared signal so that it's easy to gauge how well the class understands the material.

College students typically purchase clicker at campus bookstores, just like they shop for calculators and textbooks. They connect the handheld devices t to USB ports in their laptops. Any data sent to the instructor is stores data is stored on a receiver that can be accessed for grading or analysis. Teachers have the option of registering clickers to individual students or allowing participants to remain anonymous.

Teachers have begun using clickers in K-12 classrooms to develop curriculum and keep students engaged. Teachers can zero in on exactly what children have learned. Prompts can be worded in such a way that students strengthen their reasoning skills instead of simply recalling information.

Resources

iClicker White Papers

Educause Learning Initiative- 7 Things You Should Know About Clickers

Vanderbilt University Center for Teaching Introduction to Clickers

Vanderbilt University Clicker Activities

NEA Clickers and Classroom Dynamics

INTERACTIVE WHITEBOARDS

An interactive whiteboard (IW) is a whiteboard that allows teachers and students to collaborate and comment on the same surface so that the entire class can see it at the same time. SMART Education Consultant Shannon Vaughan explains that classroom technology has to keep up with the technology children use outside the classroom. "IWs utilize the latest in interactive technology. Teachers compete with iPads, smartphones, and video games. Interactive technology gives teachers the ability to grab their attention and teach them in a familiar way."

Vaughan has watched teachers who have taken her training plan creative lessons with the associated software and images, videos, and Google Earth. "The sky is the limit," says Vaughan as she describes one teacher's experience. "In just one morning, her students might learn keyboarding skills, check out online maps and satellite imagery during a geography lesson, take a virtual field trip to a museum, and present their own PowerPoint presentations in front of the class- all with the use of an IW. When a teacher is absent, the substitute can access pre-recorded lessons to keep the class on schedule."

There are IWs in all price points, to meet all school and district budgets. Colleges and universities install them in classrooms and lecture halls as well. Companies generally package IWs as part of a complete system that includes:

- Digital pens and erasers
- Lesson planning software
- K-12 curriculum activity libraries
- Teacher training and certification programs

Resources

KINDLE

A Kindle is a multi-purpose tablet that connects to the Amazon marketplace. It comes in a variety of styles, including:

- Kindle
- Paperwhite
- Fire
- Fire HD
- Fire HDX

The purchase of a Kindle includes access to millions of ebooks, newspapers, and magazine downloads, as well as copyright-free classics such as Jane Eyre and Oliver Twist. In the past when a teacher wanted to share a book with the class, he or she had to order multiple copies, wait for them to be shipped, and then distribute one to each student. With classroom Kindles, it takes just minutes to buy an eBook and send it to an entire class via the free self-service Whispercast tool.

There are numerous free books and documents offered by Kindle to supplement lesson plans. For example, teachers have access to the complete U.S. Constitution. In both K-12 and college classrooms, teachers can instantly downloads handouts and study guides, eliminating the cost of paper copies and ensuring that papers won't be lost.

Elementary school teachers have effectively used Kindle devices as part of class book clubs and summer reading programs. The Kindle has features such as text-to-speech and flexible font size which can be used to build vocabulary and improve phonemic awareness. Students can add notes and highlight passages instantly. Kindle books also have built-in dictionaries and reference tools.

College students around the country now rent and buy textbooks to download on Kindle devices. The Notebook application displays notes, provides colored highlights, saves images and keeps track of pages read with bookmarks. Kindles can also can mark and filter the most important at test time, simplifying the studying process. The X-Ray app includes links to Wikipedia and YouTube content. The Notebook application and X-Ray for Textbooks are available on Kindle Fire HD tablets and the free Kindle reading app for iPad and Android tablets.

Resources

Kindle Features

Science Daily: Kindle at Kansas State University

10 Tips for Kindle in the Classroom

Beyond the Classroom Kindle Project

My Kindle Classroom

How to Use Kindle E-Readers in the Classroom

EduKindle

The Kindle Fire in Education

Franklin County Community Schools: Publishing Student Work on Kindles

TABLETS

Tablets are used in K-12 and college classrooms with the iPad being one of the most popular devices. There are many ways to incorporate tablets in school, including student collaboration and educational games. Students can also keep track of handouts without worrying about losing them because they are stored digitally. Some other benefits of using tablets include:

- Access to a virtual library
- 3-D object manipulation
- Portability
- Note taking and homework on one device
- Instant messaging for class collaboration

Resources

The New York Times: No Child Left Untableted

10 Technologies to Use in a Laptop/Tablet Classroom

Verizon Insider's Guide: How Tablets Are Revolutionizing the Modern College Experience

Using Tablets in the Classroom

University of Illinois: Tablet PCs for Classroom Use

Tablets Are Changing the Classroom

ONLINE COURSES, PROGRAMS AND ACADEMIES (MASSIVE OPEN ONLINE COURSES)

Massive Open Online Courses make it possible for students to access … (editing)

KHAN ACADEMY

Khan Academy is a non-profit educational website created by educator Salman Khan in 2006. Khan, a graduate of MIT and Harvard Business School wanted to provide a free world-class education for anyone anywhere. Students and teachers have access to a personalized learning dashboard which allows them to connect to thousands of educational resources. There are over 100,000 exercise programs and more than 4000 micro lectures stored on YouTube in virtually every academic discipline. The only requirement is an Internet connection, because Khan Academy is free. More than 10,000,000 students use the site each month.

Using Khan Academy in the classroom can strengthen lesson plans. For example, students can practice math at their own pace with the adaptive assessment. Kindergarteners can do simple addition and subtraction and high school or college students can work on calculus. There is no end to the material because each problem is randomly-generated. If a concept is confusing, the problem can be broken down into small steps. There are also videos explaining each concept.

The site keeps track of each user's process and provides learning statistics and at-a-glance information to let teachers know if goals are being met. Teachers can use the results to identify problem areas and modify classroom lessons. Users earn badges as they master concepts, in a wide range of difficulties. Some badges are east to earn but earning legendary badges can take years.

COURSERA

Stanford University computer science professors Andrew Ng and Daphne Koller founded Coursera in 2012. The comprehensive MOOC site offers more than 600 online and iOS courses in the Humanities, Medicine, Biology, Social Sciences, Mathematics, Business, and Computer Science as part of partnerships with over 100 institutions of higher learning, including Princeton, Duke University, and the University of Pennsylvania.

Participants watch short video-lectures before completing and weekly assignments. Students can communicate on web forums where students can communicate. Some students arrange face to face study groups through online meetup websites such as meetup.com.

Although Coursera courses are all offered free of charge, some classes offer Signature Track, a paid option. It securely links coursework to a student's identity to prove that the individual completed the assignments and not someone else. When the course is completed, Coursera and the participating university issue a Verified Certificate.

The American Council on Education approved the following courses for college credit:

 Algebra (University of California, Irvine)

- Pre-Calculus (University of California, Irvine)
- Introduction to Genetics and Evolution (Duke University)
- Bioelectricity: A Quantitative Approach (Duke University)
- Calculus (University of Pennsylvania)

NPTEL

NPTEL (National Programme on Technology Enhanced Learning) provides e-learning through free online Web and Video courses in Engineering, Science and the Humanities. The program is an initiative by seven Indian Institutes of Technology (IIT Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and Indian Institute of Science (IISc) to create the content for over 100 courses, each designed to be completed in 40 hours. Coursework is meant to fill the large gap that exists between the current expertise level of faculty in institutions of higher learning such as the IITs/IISc and those in private and other government -aided engineering institutions in India.

OCW

MIT offers over 2.150 courses through OpenCourseWare (OCW), a web-based service aimed to advance knowledge and educate students all over the world. The site has had over 125 million visits by individuals seeking reference materials to develop curriculum, review basic concepts, and keep current of developments in various fields.

Although OCW courses are developed at the college-level, OCW targets high school students and educators as well. Highlights for High School is an open educational resource developed by OCW that provides free classroom materials for high school educators, students, and parents. The material is geared toward high school juniors and seniors but other students can also benefit.

Educators and students can use OCW courses to:

- Support classroom lesson plans
- Create independent study projects
- Help with homework and exams
- Prepare for AP exams

The site is broken up into two sections: Subjects and Exam Preparation. Subjects are arranged by topics familiar to high school students such as mathematics, physics, and biology. Within each subject is content such as labs, courses, and video resources. The Exam Preparation section is aimed at students who are preparing to take Advanced Placement exams in Biology, Calculus, Chemistry, or Physics. It includes searchable supplemental OCW course materials.

MR UNIVERSITY

MRUniversity (Marginal Resolution University) is an online education website run by George Mason University economics professors and Marginal Revolution bloggers Tyler Cowen and Alex Tabarrok as of 2012. Students and educators can enroll for classes on the site or access free videos and course materials that are offered to the public. The videos are made from PowerPoint slide presentations and include voice-overs, but audio can be downloaded separately. Students who register for a course and take the final examination receive a Certificate of Completion.

EDX

MIT and Harvard University established EdX to support research on teaching and learning and to see how technologies can best be used in the classroom. Anyone with an Internet connection can sign up for free, self-paced edX courses. They are available in a wide range of disciplines, including Science, Art, Technology, and taught by top professors.

Students have the option of receiving a Certificate of Achievement after paying a small fee and demonstrating mastery of the materials. Courses can also be audited. Materials include videos and game-like labs, such as the 3D virtual molecule builder. There are online discussion groups and other interactive activities.

When the iPhone entered the landscape in 2007, it was immediately embraced as a revolutionary tool. However, few were able to envision that the iPhone would be the start of a mobile application market worth billions of dollars, strongly targeted to children and teens. A 2012 study by Nielson Company shows that in homes where there is a tablet, 57 percent of children use educational applications or "apps."

A report by the Joan Ganz Cooney Center, examined the content of educational children's apps in the iTunes store and found over 80 percent of the top-selling education apps targeted children. There are currently over 60,000 educational apps in the iTunes store and in the Android market, used by educators, parents, and students to enhance learning. Here are 10 of the best apps for Pre-K, Elementary School, Middle School, High School, and College students.

*PRE-K APPS

Bugsy Pre-K / Math / Reading (iOS)

Students learn colors, shapes, letters, phonics, and number skills with the Bugsy Pre-K app and then earn digital toys for answering questions correctly. It has a multi-user function for classroom use so that teachers can set up individual student accounts to track progress.

Draw and Tell / Art (iOS)

It can often be difficult for pre-K educators to decipher children's drawings. With Draw and Tell, children can design or color a picture and then tell the story behind it with confidence. A voice-recording is saved along with the picture.

Endless Alphabet / Reading (iOS, Android)

Kids can learn their ABCs and build vocabulary with the sweet monsters in the Endless Alphabet app. There is an interactive puzzle game with talking letters and an animation for each of the over 50 words.

Etch a Sketch HD / Art (iOS, Android, Google Play)

Generations of children used the Etch a Sketch to create images out of fine lines by turning two white knobs, Children can now draw freehand or use virtual knobs to create artwork on mobile devices. Parents can upload photos for kids to draw on top of and post artwork to Facebook.

Monkey Preschool Lunchbox / Math / Reading (iOS, Android)

Preschoolers build letter, color, shape, counting, and pattern skills with the Monkey Preschool Lunchbox app. Children fill a monkey's lunch box with fruit during six different activities. After winning several activities in a row, they can choose a cartoon sticker to place on a personalized virtual canvas board.

The Monster at the End of This Book / Reading (iOS)

The classic 1970s story The Monster at the End of This Book from Sesame Street is also an iPad app. There are a variety of interactive activities on each of the book's 12 pages. Kids can untie ropes, unravel a knot, and tickle Grover. Sesame Street characters read the story out loud.

PBS Parents Play and Learn / Math / Reading (iOS, Android, Google Play)

The bilingual PBS Parents Play & Learn provides more than a dozen with over 50 hands-on activities that parents can play with their kids, each themed around a familiar location – including the grocery store, car, and kitchen. Parent notes about math and literacy skills are included with each game to encourage dialogue.

Preschool Arcade / Math / Reading (iOS, Android, Google Play)

Preschool Arcade is an animated game that teaches alphabet recognition, enforces basic number skills, and reviews cognitive learning methods. The four mini-games included in the app are:

- ABC Invasion
- Pinball 123
- Claw-Crane Matching
- Whack-A-Mole Colors Fame

Teach Me: Kindergarten / Math / Reading (iOS)

Children earn coins by practicing basic math, reading, and spelling concepts with the Teach Me: Kindergarten app. Coins buy virtual stickers to place onto backdrops or fish to create an aquarium. Parents can set difficulty levels. TeachMe: Toddler and Teach Me: First Grade are two other apps available also available.

Wheels on the Bus / Math / Reading (iOS, Android)

Children earn coins by practicing basic math, reading, and spelling concepts with the Teach Me: Kindergarten app. Coins buy virtual stickers to place onto backdrops or fish to create an aquarium. Parents can set difficulty levels. TeachMe: Toddler and Teach Me: First Grade are two other apps available also available.

ELEMENTARY SCHOOL APPS

Accelerated Reader / Reading (iOS)

With Accelerated Reader (AR), students take quizzes about books they've read to earn points. The CCR Report allows teachers to monitor student progress toward College and Career Readiness expectations. AR utilizes the ATOS readability formula from the Common Core State Standards. Students can use the app to make progress at home.

Discovery Education / Science (iOS)

Students are able to explore thousands of video clips that cover core curriculum areas in grades K-12. Teachers can browse hundreds of lesson plans that incorporate Discovery Education.

Draw 3D! / Art (iOS)

Children draw 3D images that can be viewed without special glasses. First draw a picture and then click a button to make it 3D with the use of austereograms, teaching depth percention. Pictures can be sent to friends via Facebook, Twitter, and email.

Dreambox / Math (iOS)

Students master elementary math key concepts with the Dreambox app, accessible at home and school. The curriculum aligns with the following Common Core Standards:

- Counting and Cardinality
- Comparing
- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- Number and Operations in Fractions

GeoMaster Plus / Social Studies (iOS)

GeoMasterPlus for the iPad allows students to practice identifying capitals, countries, and landmarks around the world after studying a simple interactive atlas. National geographic features such as mountain ranges and flags of each country are also included. Levels are progressively difficult.

My Congress / Social Studies (iOS)

My Congress is a portal to detailed information about elected U.S. Congressional officials. Students can track news, video, and Twitter feeds, and contact official directly.

Raz-Kids / Reading (iOS, Android, Kindle)

The Raz-Kids program provides access to over 400 interactive, leveled eBooks in English and Spanish spanning 27 levels. Students take eQuizzes that test comprehension and later teachers receive skill reports based on the results. Teachers also have access to online running records so that they can digitally assess students. Students can read and take quizzes at school and at home on tablets or mobile devices.

Science 360 / Science (iOS, Android)

The Science 360 app was developed by the National Science Foundation to provide student's easy access to science and engineering images and video from around the world. The newsfeed includes streaming videos of breaking stories. Students can share images with email, Facebook, and Twitter.

Simple Mind Mapping / Writing (iOS)

Students use the Simple Mind Mapping tool to brainstorm, collect ideas, and structure thoughts as part of the writing process. It includes customizable colors and fonts.

Sumdog / Math / Reading (iOS)

Sumdog is a series of free educational games to motivate students while they strengthen math and reading skills. Students play against other children around the world while teacher's control what they learn. The app is available on iTunes for children to play at home.

MIDDLE SCHOOL APPS

Buzz Math / Math (iOS)

Teachers can send assignments and follow students' progression. There are over 3,000 problems aligned with the Common Core State Standards. Features include:

- Detailed reporting tools
- Automated corrections
- Audio reading of text
- Single-click activity assignment
- SMART board compatible

eduPad's iTooch Language Arts / Language Arts (iOS, Android)

The eduPad's iTouch Language Arts program is a series of grade-level apps for reviewing concepts stressed by the Common Core State Standards. For example, the 7th Grade iTooch Language Arts app offers more than 50 chapters and 1,600 individual interactive exercises in reading, writing, grammar and vocabulary. It also incorporates outside sources like dictionaries.

Geography Drive USA / Social Studies (iOS)

Students are challenged to drive virtual cars to each of the 50 United States by answering questions. They earn money for each correct answer to buy fuel and customize cars. Trophies are awarded for various accomplishments. There are over 750 state, national, and political geography questions included in the app.

goREACT / Science (iOS)

Students can virtually create chemical reactions with free iPad app goREACT from the Museum of Science and Industry, Chicago. Students can easily drag elements from the periodic table to the "reaction area." There are a variety of suggested reactions to help students get started and the app supports 300 total chemical reactions with pictures and videos

History Clock / Social Studies (iOS)

Each time of day is linked to historical trivia. Key figures and places are linked to corresponding Wikipedia pages. Modern events can be accessed when app is switched to 24-hour mode.

Monkey in the Middle / Math / Science (iOS)

Winner of two Best Educational Apps of 2013 Awards, this app allows students to compete against friends in games aligned to Common Core State Standards. There are built-in subject notes and links to online tutorials. They can even review and prepare for standardized tests.

Reading Trainer / Reading (iOS)

Reading Trainer offers 12 exercises to help students increase reading speed while improving retention rate. Students can also improve foreign language skills with Spanish, Italian, French, German, and Russian versions. Reading Trainer was the highest ranked instructional app on the 21st Century Fluency Project's "Best 100 iPad Apps for Middle School Students."

Shake-a-Phrase / Writing (iOS)

Students can use Shake-a-Phrase for the iPad to start stories and practice recognizing parts of speech. There are three modes (shake it, story starter, quiz mode). Each mode has five themes:

- Animals,
- Monsters
- Fairytales
- Sports
- Random

Skrambler X / Art (iOS)

Students assemble famous masterpieces by over 30 artists on the Skrambler X app, a jigsaw puzzle mindware for the iPad. Interesting facts about artists and their artwork appear as students put each piece in its place. Progress is saved automatically.

Storehouse / Writing (iOS)

Storehouse allows students to tell stories with pictures and video clips on the iPad by combining images, texts, and clips on a blank canvas. Images and video can be imported from the iPad's camera roll, Instagram, Dropbox, and Flickr. Stories can be shared through email, Facebook, and Twitter. Stories published through Storehouse have their own URLs for online viewing.

HIGH SCHOOL APPS

American History Test Prep / Social Studies (iOS)

Students studying World History can use this app to remember material by using flashcards with text and audio. Multiple choice quizzes are also included. The app covers topics from early history to the Cold War.

3D Brain / Science (iOS)

3D Brain is a free iPad app featuring a three-dimensional model of the human brain. Students can rotate the brain and learn information about each part. There are also case studies about brain damage and disorders of the brain.

Ezy Trigonometry / Math (iOS)

Ezy Trigonometry is designed to help students understand trigonometry. They can explore relations between angles and trigonometric ratios. The app includes an exact trigonometric ratios table and a handbook of trigonometric formulas. Flexible settings include:

- Radians
- Degrees
- Related angles
- Angle snapping

All object information can be viewed and edited, and material can be presented by connecting an iPhone or iPad to a TV or projector.

Motion X GPS / Social Studies (iOS)

The app includes navigation instruments and maps from all over the world. It can be used with geography lessons and geocaching, the real-world treasure hunt.

Solve the Outbreak / Science (iOS)

The Centers for Disease Control and Prevention (CDPC) produced Solve the Outbreak, a free iPad game app produced by the Centers for Disease Control and Prevention. It contains three epidemics for students to research by reading the background, examining clues and analyzing data. Students also answer questions that put students in the role of a medical professional tasked with helping to curtail the spread of the epidemic.

Touch Van Gogh / Art (iOS)

The Van Gogh Museum created this free iPad app to help students study three of the artist's paintings: View from Theo's Apartment, The Bedroom, and Daubigny's Garden. Students also learn about the museum's restoration process.

Write About This / Writing (iOS)

A free version of Write About This with 50 prompts and a paid version with 500 prompts is and available for the iPad, containing visual, text, and voice writing prompts for students. Students can respond to the writing prompts directly in the app or elsewhere. Teachers create a writing prompt by choosing a picture from the iPad camera roll, typing text, and recording voice instructions. Both prompts and responses can be shared through email.

Virtual Frog Dissection / Science (iOS)

Students dissect frogs virtually with the Virtual Frog Dissection app. Images appear in 3D and step by step instructions are provided with voice-over.

COLLEGE APPS

ASKetch / Art (iOS)

Students can simulate drawing with charcoal on their iOS device. Beginners have the opportunity to draw without worrying about palettes and tools. Advanced artists can explore drawing on a buttery, tonal canvas. Three pencil types are included.

Calcbot / Math (iOS)

This calculator app for the iPhone and iPad allows students to access advanced, scientific functions with a simple swipe. Students can record their history and email it or send values back into the calculator.

Easy Bib / Writing (iOS, Android)

The Easy Bib app generates MLA, APA, and Chicago style apps instantly when students scan the book's bar code or enter the title manually. Bibliographies can be exported via email.

The Elements / Science (iOS)

The Elements app presents the periodic table in an interactive platform. Students can touch elements to bring up in-depth information and fun facts. Optional 3D glasses allow for 3D viewing.

GoSkyWatch Planetarium / Science (iOS)

It's possible to quickly locate and identify stars, planets, constellations and galaxies with the GoSkyWatch Planetarium app. Students simply point it to the sky to access the information on a full 180 degree display.

MathRef / Math (iOS)

This reference app helps college students by providing over 1400 formulas, figures, tips, and examples.

Pear Note / Tool (iOS)

Students can do more than record lectures with the Pear Note app. They can also integrate the notes they type during the lecture. When looking back at notes later, students can tap anywhere to make the audio jump to that point so they can hear the lecture and get anything they missed.

Science Challenge / Science (Android)

Multiple-choice science quiz that covers the following:

- Physics
- Chemistry
- Biology
- Zoology
- Earth
- Inventions
- Space

Shakespeare / English Literature (iOS)

This free Shakespeare app includes the full texts of 40 plays, six poems and 154 sonnets. It bookmarks the last page read and has a searchable menu. It is rated 12+ for content.

STUDYBLUE / Tool (iOS, Android)

Students can create digital flashcards and upload study materials to review on the computer or smartphone. It can filter out the flashcards once they are memorized and import notes from Evernote also.

CONCLUSION

The current generation of students has always been influenced by technology. When teachers integrate technology into the classroom, whether by using tools, online resources, or apps, they have the power to engage students at their level of interest. The key is to find the top technological tools and to incorporate them into lessons in clever ways.

Technology can't be the focus. Instead technology must be used to support strong material. Many of the tools marketed to educators in grades K-12 correspond with Common Core State Standards. When teachers use tools that support the new curriculum to prepare students to meet the expected standards, everyone can benefit.