

Applications of Educational Technology

Applications of Educational Technology

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STILLWATER, OK



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Welcome to the Applications of Educational Technology eBook. The resource comes alongside the Oklahoma State University Emerging Technologies and Creativity Research Lab, where students in this class will play and help in transforming education through creative habits!

The purpose of this online resource is to serve as an interactive open textbook for EDTC 3123 Applications of Educational Technology at Oklahoma State University. We invite you to ask questions, contribute resources, and participate in making this a living, collaborative resource for all educators!

Course information: This course is an introduction to the design and development of instruction using educational media and technology. It involves development of teaching and learning materials using digital technologies, contemporary applications of computers and other electronic systems to instruction. Because this is a preservice education course, the main focus is on effective integration of educational technology and instructional design.

This is a semester-long course that is taught face-to-face and aims not only to model excellence in teaching with technology but also to provide a safe environment within which preservice teachers work in teams to facilitate active and engaged peer learning that reflects best practices in technology integration, instructional design, content presentation, instructional strategies, standards-based assessment, and lesson reflection. You will experience true student-centered learning in this class with your instructor modelling the role of facilitator.

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Cover Page

MY TECH PLAYGROUND: AN EBOOK FOR EDTC 3123 APPLICATIONS OF EDUCATION TECHNOLOGY

Created/Curated by Susan L. Stansberry

2018

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Update 2.9.2024, Kathy Essmiller. The update included light editing for format, link check and remediation, metadata revision, and addition of publisher information. The resource was re-exported following this update. ~KE

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Learning to Learn any Technology

You've heard the old adage . . .

If you give a man a fish, you feed him for a day; if you teach a man to fish, you feed him for a lifetime.

The aim of part one of this chapter is to help you gain knowledge and skill that will **transfer to learning any new technology**.

Steps in Learning to Learn

Let's talk about learning to learn any technology. There are six steps that we'll discuss:

1. Consider your **Purpose**
2. Explore the **Possibilities**
3. Find **Patterns**
4. Learn from the **Pros**
5. **Play**
6. Take **Pride**

CONSIDER YOUR PURPOSE

Sometimes you are assigned a technology (could be a piece of software or a hardware tool) to learn, as you will be doing in the next two weeks with SMART Notebook, OneNote, Office 365, and Diigo. When that happens, the first thing you want to learn is the purpose of that tool. What problem was this technology designed to solve? Other times, you'll go about this the opposite way — first considering the problem you need to solve and then searching for technology designed for the purpose of solving that problem.

You can think of any technology as a system – a combination of parts. The parts of a system may be physical (a computer is made up of physical components connected to a central processor) or processes (whatever email system you use connects the processes of sending, receiving, and organizing email messages). Systems and purpose go hand-in-hand, and it's important to recognize these at the beginning of learning a technology. You are already familiar with technologies designed to enhance your educational experience like information systems (ex: SIS), communication systems (Cowboy Mail or Orange Mail), collaboration systems (Google Docs), and systems that combine all three of these purposes (Online Classroom).

EXPLORE THE POSSIBILITIES

Once you have figured out your purpose for learning a particular technology, your next step is to explore the possibilities. You want to know what you will be able to do with this tool. The developer's website for this tool is where you will want to start. Most sites will have a gallery of users' work, which gives you a great idea of the possibilities. Another common tactic is to do a general web search for "what can I do with _____?"

There are almost always multiple tools to fulfill your purpose. You'll want to select the best one that fits within the systems you already use.

FIND PATTERNS

Have you ever noticed how you learn to use one technology and then easily transition to another tool based on that previous knowledge and experience? Whether you realized it or not, many of you used knowledge gained from your very cool MySpace page when you started using Facebook. Then, when you transitioned to Twitter and Instagram, you subconsciously were seeing similarities and differences in them compared to Facebook. While learning technologies, make a conscious effort to find similarities and make comparisons to what you already know. For example, you're almost certain to find a top menu bar with the items "File," "Edit," "View," "Help" and others in practically any app you open.

LEARN FROM THE PROS

Finding patterns can increase your comfort level when learning a new tool, but going to the pros who already know what they are doing will take you even further. Developers typically offer tutorials on their website or under the "Help" menu. The other pros are those you may know socially or professionally — don't hesitate to send out a call to your personal or professional network to see who else might be using that technology and what advice they have for you. If you are conducting a general web search for tutorials, be as specific as possible to get the most meaningful results. Another helpful resource can be found in sites that build tutorials as a commercial enterprise. They often have some free resources while others are only available with a subscription.

PLAY

This step is actually harder than it sounds like! Probably from about the time you entered school, you started getting the unfortunately misguided message that learning is work and play is not a valuable way to spend your time. Too many adults avoid tinkering around with a technology out of fear of not doing something right, but we always learn more from our efforts and mistakes than we do from doing something right the first time. Play is an extremely valuable part of learning technologies, and you may be one of those people who has to actually schedule time to play on your daily calendar!

TAKE PRIDE

The final step in the process of learning a new technology is taking pride in what you've accomplished. Even if you didn't finish with some amazing product worthy of selling on the home shopping network, consider how very much you gained through the process of learning and will be able to apply to your next learning endeavor. Besides, sharing your learning journey with someone else may be just what they need!

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Differentiated Learning with Educational Technology

Essential Questions

Why should I differentiate my instruction for my students? Think beyond understanding that students learn differently.

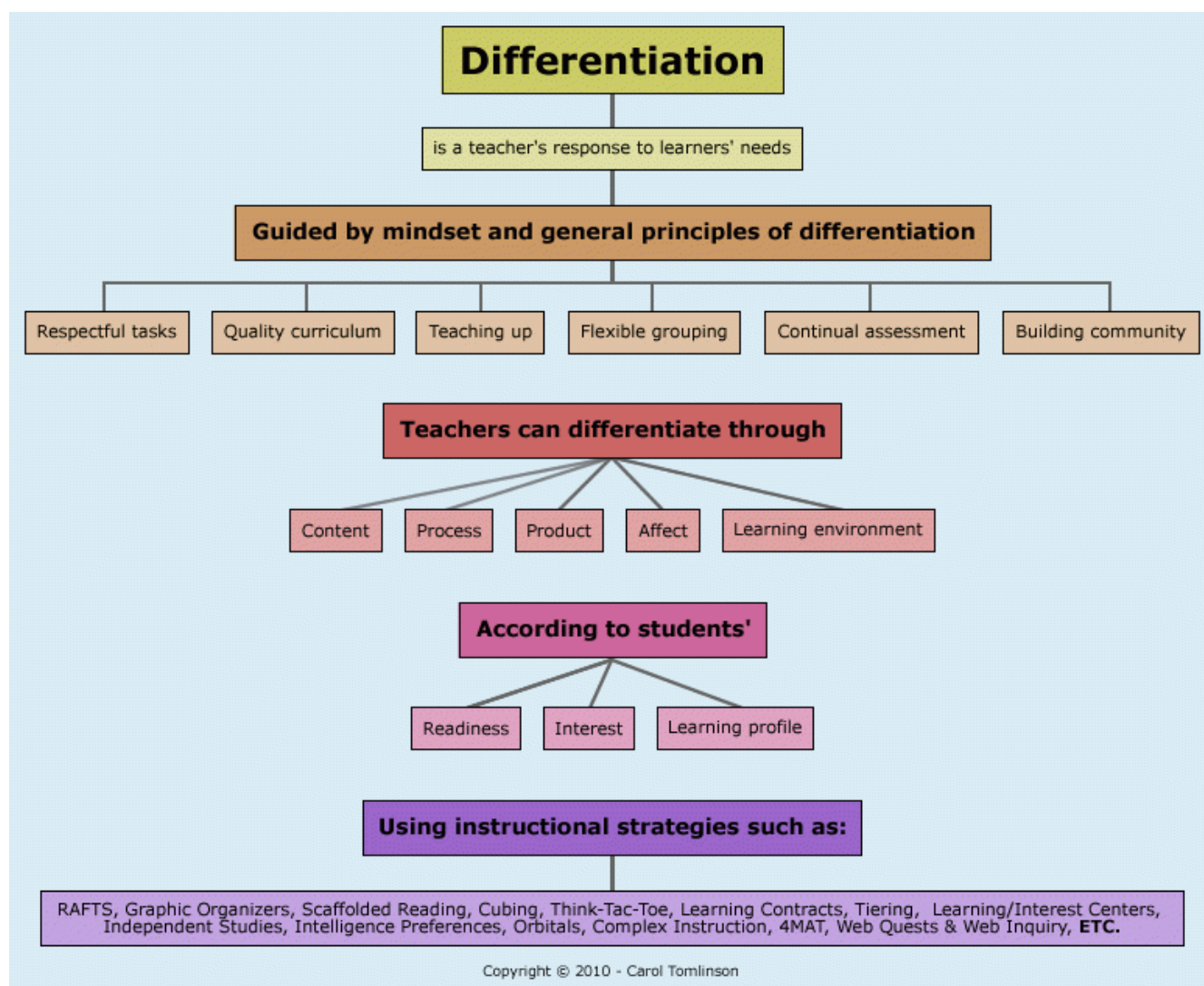
What does meaningful differentiation look like in a real classroom?

Which teaching strategies can I employ to meet my students' individual needs?

In what ways might I use technology to differentiate my instruction for my students?

Differentiated Learning with Educational Technology

Differentiated instruction is recognizing and being responsive to different learning needs of individuals and small groups of students. The website *Differentiation Central* offers an excellent flow chart of the process. Access the full website at <http://differentiationcentral.com/model/>.



The *Teaching Channel* website offers a series of videos for new teachers. Explore the site's K12 hub differentiation topics and see if you can identify some specific strategies for differentiating in the classroom.

Tomlinson's Differentiated Instruction Model (2010) is based on six elements:

- High-quality curriculum – identifying exactly what you want the students to know, understand, and be able to do at a rigorous and challenging level
- Continual assessment – using pre-assessments to determine what the students already know, understand and are able to do as well as where their interests lie; using formative assessments to determine when and how re-teaching needs to be done; and using summative assessments to allow students to demonstrate what they have learned
- Respectful tasks – All tasks should be challenging, interesting and worth doing. If some students are engaged in this type of work while others are completing drill and practice workshop, there is disrespect happening.
- Building community – The differentiated learning community must be a safe, accepting, risk-free environment where failure and learning from it is celebrated. Therefore, it is necessary for the teacher to insure that all learners understand and respect the process of differentiating instruction.
- Flexible grouping – At any given time, students may work individually, as a whole group, or in small groups or with a partner based on interests (similar or dissimilar) or readiness to learn (similar or dissimilar).
- Teaching up – Tomlinson (2010) notes that all students should be challenged to work up to the level just above his or her current competence. Differentiation is NOT about “dumbing down” the content for some students but not

for others.

The *Differentiated Instruction Teachers' Guide* (2007) offers four areas where differentiation can occur:

- Content – All students in your class will be expected to master the given curriculum standards (Oklahoma Content Standards, currently-used to be CCSS, PASS), but you can provide them different paths to gaining that knowledge. A pre-assessment is critical to determine what current knowledge and skill have already been mastered by individuals so the teacher can then determine which paths need to be made available.
 - Process – Different methods can be employed based on the idea that how students learn best can be different. Many teachers use a “menu” of activities for students to choose the process they believe will work best for them.
 - Products – Each student needs to demonstrate mastery of a standard or objective, but they may be able to demonstrate that mastery in a very different way than their classmates. A very clear summative assessment tool, like a rubric focused on what the student knows, understands and is able to do, is critical.
 - Learning Environment – The learning environment in a differentiated classroom includes both physical and social/emotional aspects. The physical space may include adjustments to lighting, noise, types of furniture, and equipment. The social/emotional environment must be built upon respect for individual differences and supportive classroom management.
-

Judith Dodge (2009, p. 9, <http://www.slideshare.net/robertojoephgalvan/25-quickformativeassessments>) offers specific strategies to help teachers address student needs at different levels of readiness. Which of these suggestions could you consider?

Scaffolding Struggling Learners

- Offer teacher direction (reteaching with a *different* method)
- Allow the student to work with a reading partner, study buddy, or learning partner. (Buddy-up an English language learner (ELL) with another student.) This will provide peer support for collaborative learning.
- Allow students to use class notes, textbooks, and/or other classroom resources to complete the task.
- Provide a model or exemplar (of a similar problem solved or a sample of the type of writing expected).
- Furnish step-by-step directions; break down the task.
- Provide hints or tips.
- Color-code different elements; highlight for focusing; provide “masks and markers” for focused attention on specific text.
- Provide sentence strips, sticky labels with terms, or manipulatives (plastic coins, Judy clocks, Unifix cubes, fraction tiles, number lines, algebraic tiles, calculators, etc.).
- Provide a partially completed graphic organizer or outline.
- Provide out-of-sequence steps for students to reorganize.
- Allow additional time.
- Provide a cloze (fill-in-the-blank) paragraph (with or without a word box) for students whose language is extremely limited or for those who struggle with grapho-motor skills.
- Give a framed paragraph or essay (with sentence starters to help organize the writing).
- Provide guided questions.
- Supply a word bank and definitions.
- Support with visuals, diagrams, or pictures.

- Provide words on labels for students to simply pull off and place appropriately.

Challenging Advanced Learners

- Design activities that are more complex, abstract, independent, and/or multistep.
- Pose a challenge question or task that requires them to think beyond the concrete and obvious response (from the newly learned material) to more abstract ideas and new use of the information.
- Require more complex expression of ideas: different types of sentences, synonyms, more than one adjective or action (verb) to describe what's happening.
- Require that metaphors and similes, idiomatic expressions, or specific literary elements be included in their writing.
- Ask students to make text-to-text and text-to-world connections (more abstract than text-to-self connections).
- Require students to note relationships and point out connections among ideas: compare and contrast; cause and effect; problem and solution; sequence, steps, or change over time; advantages and disadvantages; benefits; etc.
- Have students create their own pattern, graph, experiment, word problem, scenario, story, poem, etc.
- Ask students to tell the story from a different point of view.
- Ask students to place themselves into the story or time period and write from the first-person point of view.
- Ask students to consider "What if?" scenarios
- Provide multistep math problems.
- Include distracters.
- Do not provide a visual prompt.
- Ask students to suggest tips or hints that would help others who struggle to make sense of the information.
- Provide a problem or model that does not work; have students problem-solve.
- Have students use the information in a completely new way (*Design an awareness campaign about . . .; Create a flyer to inform . . .; Write/give a speech to convince . . .; Write an article to educate . . .; Write an ad to warn others about . . .; Design a program to solve the problem of . . .*)

Technology in the classroom is crucial to the success of a differentiated classroom. Read the *Educational Leadership* article "From Gadget to Gift" and watch the video interview with Carol Ann Tomlinson to get some ideas.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=24#oembed-1>

Now see if some of the videos from the Differentiation Central website can help you bring it all together.

ISTE Standards

Which ISTE Standards do you think this chapter could help you address? The standards listed below are from an older draft, but they are still a good way to think about and scope your work.

2. Design and Develop Digital Age Learning Experiences and Assessments

- Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE-S.
 - a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
 - b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
 - c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
 - d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

4. Promote and Model Digital Citizenship and Responsibility

- Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.
 - b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources

Resources

Ian Byrd's The (new) Differentiator <http://byrdseed.com/differentiator/>

Cool Tools Digital Differentiation <http://d97cooltools.blogspot.com.au/2012/02/digital-differentiation-get-wired.html>

Andy Warner (UK teacher) blogpost on differentiation <http://andywarner78.wordpress.com/2013/05/09/why-weve-got-differentiation-wrong/>

Ministry of Education. (2007). *Differentiated instruction teacher's guide: Getting to the core of teaching and learning*. Toronto: Queen's Printer for Ontario.

Tomlinson, C.A. & Imbeau, M.B. (2010). *Leading and managing a differentiated classroom*. Alexandria, VA: ASCD.

Cybraryman's Differentiated Instruction resources <http://www.cybraryman.com/differentiated.html>

Five Ways Technology in the Classroom is Changing Education <http://www.securedgenetworks.com/blog/5-Ways-Technology-in-the-Classroom-is-Changing-Education>
A Practical IAGC Pinterest board on Differentiation for Gifted Students <https://www.pinterest.com/iagcgifted/differentiation/>

Bowie, TX ISD Pinterest board on Differentiation for SPED Students <https://www.pinterest.com/bowieisd/sped-differentiation/>

Technology Tools for Differentiation <http://www.edutopia.org/blog/differentiated-instruction-social-media-tools-john-mccarthy>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Instructional Design

Essential Questions

- What is instructional design?
- What are Gagne's Nine Events of Instruction?
- What are the most engaging ways content can be presented so students remain active while gaining content knowledge?
- What learning community resources are available to find and share digital resources for creating engaging lessons?

Models for Designing Instruction

Instructional design is the practice of creating “instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing” (Merrill, et al., 1996).

For you, as a future teacher, this means that there is a whole academic field dedicated to helping you create the best possible lessons for your students. You will encounter a variety of methods for creating lesson plans during your coursework and when you take your first teaching job; but, they all have some elements in common.

Below are three different instructional design approaches — see if you can spot the similarities and differences:

ADDIE Model	ASSURE Model	Understanding by Design (Backward Design)
<p>Analysis (clarify the instructional goals and objectives and identify the learning environment and learner's existing knowledge and skills)Design (development of learning objectives, assessment instruments, exercises, content, subject matter analysis, lesson planning and media selection)</p> <p>Development (developers create and assemble the content assets that were created in the design phase)</p> <p>Implementation (a procedure for training the facilitators and the learners is developed)</p> <p>Evaluation (both formative and summative assessments are planned for)</p>	<p>A – Analyze learners</p> <p>S – State standards & objectives</p> <p>S – Select strategies, media & materials</p> <p>U – Utilize technology, media & materials</p> <p>R – Require learner participation</p> <p>E – Evaluate & revise</p>	<p>Stage 1: Identify Desired Results (enduring understandings and essential questions)Stage 2: Determine Acceptable Evidence of Learning (assessment strategies)</p> <p>Stage 3: Design Learning Experiences & Instruction (objectives and methods)</p>

Notice that each of the three instructional design models systematically consider the basics: **who** the learners are, **what** is to be learned, **how** the learning will be assessed, and **which** strategies and resources will be used to make sure students learn. One difference you may have noticed between the three is that Understanding by Design is backwards — it begins with the end in mind and then plans how to get there.

Instructional Strategies

In this course you will have the opportunity to develop and teach a lesson to your peers as part of a teaching team. We will be using a particular instructional design model to make sure you've provided the best opportunity for your “students” to learn: Gagne's Nine Events of Instruction.

The graphic below gives you some details about the model:

EVENTS IN INSTRUCTION

"Instruction is a set of events external to the learner designed to support the internal processes of learning" (Gagne, Wager, Golas & Keller, 2005).

An Events in Instruction Series

STUDENTS' GAINING ATTENTION

1

How do you gain your students' attention?

HERE ARE THE OBJECTIVES

2

How do you inform the learner of the objectives?

PRIOR KNOWLEDGE

3

How do you determine the students' prior knowledge?

PRESENTING

4

Stimulating MATERIAL

By following these nine steps, you make sure you have taught a thorough lesson. Side note: the image above was created using Piktochart. We may use this platform later in the course!

“Step 4: Present Material” is often the most difficult to plan for. We all have been lectured at for so many years, and even though it's typically not our favorite way to learn, we tend to fall back on it while we're teaching. Your challenge in this course will be to come up with interactive and engaging ways to present material so your “students” are actively learning. Kevin Yee has collected 186 interactive techniques to keep students engaged in your teaching. You can see the full list at

http://www.fctl.ucf.edu/teachingandlearningresources/coursedesign/assessment/content/101_tips.pdf, but we've selected a few to share with you below:

Strategy	Description
Category: Lecture	
Instructor Storytelling	Instructor illustrates a concept, idea, or principle with a real-life application, model, or case-study.
Empty Outlines	Distribute a partially completed outline of today's lecture and ask students to fill it in. Useful at start or at end of class.
Student Polling	Use a site like Poll Everywhere (http://pollev Everywhere.com); distribute standardized cards that can be held aloft as visual responses to instructor questions (ex: green card for true, red for false, yellow for not sure); or use small erasable marker boards for each student to display an answer.
Pass the Chalk	Provide chalk, a soft toy, or small beach ball; whoever has it must answer your next question, and they pass it on to the student of their choice.
The Half Class Lecture	Divide the class in half and provide reading material to one half. Lecture on that same material to the other half of the class. Then, switch the groups and repeat, ending with a recap by pairing up members of opposite groups.
Category: Individual Student Work	
One-Minute Papers	Students write for one minute on a specific question (which might be generalized to "what was the most important thing you learned today"). Best used at the end of the class session.
Muddiest Point	Like the Minute Paper, but asks for the "most confusing" point instead. Best used at the end of the class session.
Drawing for Understanding	Students illustrate an abstract concept or idea. Comparing drawings around the room can clear up misconceptions.
Concept Mapping	Students write keywords onto sticky notes and then organize them into a flowchart. Could be less structured: students simply draw the connections they make between concepts.
Bumper Stickers	Ask students to write a slogan-like bumper sticker to illustrate a particular concept from lecture.
Category: Students Working in Pairs	
Think-Pair-Share	Students share and compare possible answers to a question with a partner before addressing the larger class.
Pair-Share-Repeat	After a pair-share experience, ask students to find a new partner and debrief the wisdom of the old partnership to this new partner.
Wisdom of Another	After any individual brainstorm or creative activity, partner students up to share their results. Then, call for volunteers of students who found their partner's work to be interesting or exemplary. Students are sometimes more willing to share in plenary the work of fellow students than their own work.
Forced Debate	Students debate in pairs, but must defend the opposite side of their personal opinion. Variation: half the class take one position, half the other. They line up and face each other. Each student may only speak once, so that all students on both sides can engage the issue.
Category: Student Groups	

Jigsaw (Group Experts)	Give each group a different topic. Re-mix groups with one planted “expert” on each topic, who now has to teach his new group.
Board Rotation	Assign groups of students to each of the boards you have set up in the room (four or more works best), and assign one topic/question per board. After each group writes an answer, they rotate to the next board and write their answer below the first, and so on around the room.
TV Commercial	In groups, students create a 30-second TV commercial for the subject currently being discussed in class. Variation: ask them to act out their commercials.
Blender	Students silently write a definition or brainstorm an idea for several minutes on paper. Then they form into groups, and two of them read their ideas and integrate elements from each. A third student reads his, and again integration occurs with the previous two, until finally everyone in the group has been integrated (or has attempted integration).
Simulation	Place the class into a long-term simulation (like as a business) to enable Problem-Based Learning (PBL).
Imaginary Show and Tell	Students pretend they have brought an object relevant to current discussion, and “display” it to the class while talking about its properties
Yee, K. (2012) . Interactive techniques. <i>Formative Classroom Assessment</i> . Karen L. Smith Faculty Center for Teaching and Learning. http://www.fctl.ucf.edu/teachingandlearningresources/coursedesign/assessment/content/101_tips.pdf	

It seems that there is an endless supply of creative ideas of how and what to teach, but how in the world does one find them and share with other teachers?! The word “curate” means to purposefully select certain things from countless possibilities. You probably have heard the term in relation to a museum curator. Due to the vast amount of resources available on the Internet, it is critical to develop skills in locating, evaluating, using, and sharing information effectively. Web-based social bookmarking sites allow users to store, organize and share resources. Typically, resources are “tagged” by users according to the individual user’s choice of classification. Since it is *social* bookmarking, you can search by common tags other users have selected as well. Common tags you may use in this class are things like “lesson plans,” “edtech,” or “teaching with technology.” You can also join a group of users who have similar interests to build a common collection of resources. We are going to be collecting resources within this course using Diigo (<http://diigo.com>) through the EDTC 3123 group.

The learning community we are building in this class will be available to you long after you complete the course and graduate.

ISTE-T Standards

2. Design and Develop Digital Age Learning Experiences and Assessments

- Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE-S.
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 - c. Customize and personalize learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools and resources
 - d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

KeyTerms

instructional design

curate

social bookmarking

tagging

cloud computing

Resources

Merrill, M. D., Drake, L., Lacy, M. J., Pratt, J., & ID2_Research_Group. (1996). Reclaiming instructional design. Educational

Technology, 36(5), 5-7. Instructional Design Models http://www.instructionaldesigncentral.com/htm/IDC_instructionaldesignmodels.htm

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Technology Integration

Essential Questions

Why would a teacher want to teach with technology?
What does effective technology integration look like?
What are the national standards for teaching and learning with technology?

Teaching WITH Technology

In the book *Meaningful Learning with Technology* (2012), authors Howland, Jonassen, and Marra set forth a set of assumptions:

- Technology is more than hardware. Technology consists also of the designs and the environments that engage learners. Technology can also consist of any reliable technique or method for engaging learning, such as cognitive-learning strategies and critical-thinking skills.
- Learning technologies can be any environment or definable set of activities that engage learners in active, constructive, intentional, authentic, and cooperative learning.
- Technologies are not conveyors or communicators of meaning. Nor should they prescribe and control all of the learner interactions.
- Technologies support meaningful learning when they fulfill a learning need — when interactions with technologies are learner initiated and learner controlled, and when interactions with the technologies are conceptually and intellectually engaging.
- Technologies should function as intellectual tool kits that enable learners to build more meaningful personal interpretations and representations of the world. These tool kits must support the intellectual functions that are required by a course of study.
- Learners and technologies should be intellectual partners, where the cognitive responsibility for performance is distributed to the partner that performs it better. (Howland, Jonassen, & Marra, 2012, p. 7)

Many people think only of computers when they consider teaching with technology, but in this class, we're going to be thinking much deeper and broader about it, as you can see from the assumptions above and in the latest definition of the field of educational technology:

“Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Association for Educational Communication & Technology, Januszewski & Molenda, 2008)

Why Technology Integration?

Chances are you have had a great teacher in your past who has inspired you. Study after study shows that the single most important factor in the quality of education a child receives is the quality of his/her teacher. We often hear students describe their best teachers as those who are tough but fair, love to learn, are enthusiastic about what they do, make learning fun, and build relationship with their students. What does all this have to do with educational technology? Watch this short video for an answer to why you would want to integrate technology in your teaching:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=31#oembed-1>

It might be fun to take the transcript from this video (direct link: <http://www.edutopia.org/technology-integration-introduction-video>) and made a word cloud of it. What words do you think might jump out?

A word cloud is a great tool to analyze what is really being said. Note how often these words were used in talking about technology integration in this video: learning, using, student, create, technology, kids, tools, make, think, work, share, personal, ideas, better, seeing, etc. A word cloud lets you see at a glance what tech integration is all about – student learning with the best possible tools available.

Can you think of a time you might have your student create a word cloud? What would you have them do after they created it?

What Does Technology Integration Look Like?

How would you know if you're seeing effective technology integration in a classroom? There are really two important variables to consider: what the teacher is doing and what is happening in the learning environment. The Arizona Technology Integration Matrix (TIM <http://www.azk12.org/tim>) is particularly helpful when making this determination. Click through and take a look.

The top row is concerned with what the teacher is doing. Notice a teacher at the “Entry” level of technology integration is the one with his/her hands on the technology and is delivering to students. This is a very “teacher-centered” scenario. Look toward the upward progression of the matrix and note that when the teacher is at the higher levels of technology he/she is not the one actually controlling the tools, but rather, he/she is acting much more as a facilitator and coach. At the low level, the focus is on the teacher’s performance, and at the higher levels, the focus is on student learning! Similarly, down the left column, we see the different types of learning environments that describe how the students are engaged in learning.

The USF Technology Integration Matrix (<http://fcit.usf.edu/matrix/matrix.php>) is another useful tool to help you see different levels of technology integration. Along the x-axis is a continuum of five levels of technology integration from lowest to highest: entry, adoption, adaptation, infusion, and transformation. Along the y-axis are the five characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed. Examples of lessons at different grade levels and in different content areas are shown at the intersection of each level of tech integration with each meaningful learning environment.

You will want to spend a couple of hours studying these great examples to fully understand what is meant by

technology integration. By the end of this course, we expect you will be able to envision yourself engaging students in meaningful learning as you continue to move toward the higher levels of technology integration.

Below is further description of the characteristics of meaningful learning environments:



An interactive H5P element has been excluded from this version of the text. You can view it online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=31#h5p-1>

With or From

As you saw in the TIM videos, each of these environments allowed for technology integration, but some seemed to be more engaging for students than others. Let's take a look at the differences between learning *from* technology and learning *with* technology:

- Learning *from* technology: This is most easily depicted as “drill and practice” or “electronic worksheets” in which the learner reacts to the technology, and the technology guides/directs the student. A high level of thinking is not needed here — just memorization or repetition. Technology serves as a repository or distributor of information.
- Learning *with* technology: When students use technologies to communicate their ideas, work in collaborative groups, conduct in-depth research, interpret and represent their interpretations, and engage conceptually and intellectually at the point they need support, they are learning with technology. Technology is serving as a partner to the learner in this instance. (Howland, Jonassen, & Marra, 2012)

You will encounter a variety of models to assist with integrating technology into teaching and learning. We've chosen to include TIM in this course, but know that there are other models as well. When you encounter different models, make sure they are focusing on improving student learning first rather than focusing on tools first!



“What an awesome **marker**! I’m going to build a lesson around this **marker**. Every student should know how to use this **marker**.”
said no teacher ever.

ISTE-T Standards

5. Engage in Professional Growth and Leadership

- Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and

demonstrating the effective use of digital tools and resources.

- a. Participate in local and global learning communities to explore creative applications of technology to improve student learning
- b. Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others
- c. Evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning
- d. Contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and

community

Key Terms

educational technology

technology integration

active learning

cooperative learning

Arizona Technology Integration Matrix

Resources

Technology Integration: Research and Best Practices (PBS Teachers) <http://www.pbs.org/teachers/librarymedia/tech-integration/>

Arizona Technology Integration Matrix (TIM) <http://www.azk12.org/tim/> Printable version without video links http://www.azk12.org/tim/docs/AZK1031_Matrix_Print.pdf

ISTE Educational Technology Standards for Students (ISTE-S) and Teachers (ISTE-T) <http://www.iste.org/standards>

Then vs. Now: How Technology in School Has Changed over Time <http://www.masterofartsinteaching.net/tech/>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Assessing Learning

Essential Questions

How do you know what to assess?
What technologies help make formative and summative assessments more effective and efficient?
How is the performance of teachers assessed?
How is the performance of schools assessed?

Learning Standards: Frameworks for Learning

There are a multitude of standards that give you a framework for knowing what your students are responsible for learning and guide you in assessing their learning. First, let's look at two frameworks revealing what students should know and be able to do in relation to technology: the ISTE Educational Technology Standards for Students (ISTE-S), the 21st Century Skills, and the Common Core.

ISTE Standards: http://www.iste.org/docs/Standards-Resources/iste-standards_students-2016_one-sheet_final.pdf?sfvrsn=0.23432948779836327

Framework Definitions: http://www.p21.org/storage/documents/P21_Framework_Definitions.pdf

Common Core Standards: <http://www.corestandards.org/read-the-standards/>

A large majority of states have adopted the Common Core standards, and most are integrating them into existing state standards. Oklahoma has re-written its Academic Standards, having previously integrated CCSS into the previously-used Oklahoma Academic Standards. Legislative actions sometimes put the future of academic standards in Oklahoma in limbo—it's a good lesson in keeping current with legislation that impacts education and educators! Keep an eye on the Oklahoma standards for your discipline, as they may undergo revision frequently.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=34#oembed-1>

Above and Beyond is a short digital story created through collaboration by members of Partnership for 21st Century Skills and FableVision. The story reflects the 21st Century Skills by showing what is possible when communication, collaboration, critical thinking and creativity (often referred to as the 4Cs) take center stage in schools and transform learning opportunities for all kids.

Formative and Summative Assessments Using Technology

Formative and *summative* assessments are both used to determine how well students are performing.

Formative assessment is ongoing and provides information needed to adjust teaching and learning (remember differentiation?). It gives important feedback to students letting them know they are on the right track and helps the teacher determine whether students are ready to move on to the next task. Summative assessment is more of a singular event at the end an instructional unit or module. To get the full picture of how well students are performing and whether or how instruction needs to be adjusted, a teacher needs both formative and summative assessments.

Fair Assessment of Student Learning

It is critical to assess your students' learning in a fair manner. The Middle States Commission on Higher Education (2008, p. 1) offers seven items that will help teachers make sure they are being fair:

1. *Have clearly stated learning outcomes* and share them with your students, so they know what you expect from them. Help them understand what your most important goals are (detailed in a rubric you will use to assess their research project).
2. *Match your assessment to what you teach* and vice versa. If you expect your students to demonstrate good writing skills, explain how you define good writing, and help students develop their skills.
3. *Use many different measures and many different **kinds** of measures.* We know that students learn and demonstrate their learning in many different ways. Some learn best by reading and writing, others through collaboration with peers, others through listening, creating a schema or design, or hands-on practice, so give your students a variety of ways to demonstrate what they've learned.
4. *Help students learn how to do the assessment task.* No matter what kind of assessment you are planning, at least some of your students will need your help in learning the skills needed to succeed on that assessment.
5. *Engage and encourage your students.* Engaging students in building the assessment can be encouraging to them. For example, when you introduce them to the rubric, ask them if they think it's missing anything or if they would like to have something else to be measured.
6. *Interpret assessment results appropriately.* Suskie (2000) notes that it is "often most appropriate to base a judgement on a standard: Did the student present compelling evidence? summarize accurately? make justifiable inferences? At other times, it may be appropriate to consider growth as well. Does the student who once hated medieval art now love it, even though she can't always remember names and dates? Does another student, once incapable of writing a coherent argument, now do so passably, even if his performance is not yet up to your usual standards?" (p. 3).
7. *Evaluate the outcomes of your assessments.* Suskie (2000) adds "if your students don't do well on a particular assessment, ask them why. Sometimes your question or prompt isn't clear; sometimes you may find that you simply didn't teach a concept well. Revise your assessment tools, your pedagogy, or both, and your assessments are bound to be fairer the next time that you use them" (p. 3).

Digital Portfolios and Deconstructing Standards

Digital portfolios can be an effective way for students and teachers to document their learning experiences. Experts distinguish 3 different types of digital or electronic portfolios that are currently in use:

- Online assessment systems where students place artifacts in an institutionally designed template
- A “print-loaded” portfolio that takes a paper text and displays electronically
- A portfolio that uses text boxes, hyperlinking, visuals, audio texts and design elements to convey a teacher’s materials.

Types of Portfolio Assessments

There are two basic “families” of portfolios: growth and best work. A “growth” portfolio shows the learner’s journey of acquiring knowledge and skills. Your professional education portfolio is an example of this. A “best work” portfolio exhibits only the learner’s very best work. This type of portfolio is one you would want to display for a potential employer. The chart below shows these two types, using “Learning & Collaboration” to describe the growth portfolio and “Showcasing Achievement” for the best work portfolio.

When using portfolios, students choose which artifacts best represent their ability to meet the standards, thus the portfolio process can be a democratic one. Choosing an artifact as evidence that you have met a specific standard is probably the hardest part of putting together your portfolio. The section below will walk you through a very critical skill that will be invaluable as you do your own work and when you are teaching your own students.

Deconstructing Standards

Here’s a video explaining the activity we’ll be doing in class:



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=34#oembed-2>

Standards can often be difficult to turn into practical plans for teaching and learning, but they are extremely important because they let the learner know what the target is. In this class, our learning target is to master the ISTE-T standards. These standards tell us what every teacher should know and be able to do in relation to educational technology, so they are very important!

Deconstructing, or unpacking, standards is a process educators undertake to clarify exactly what is meant by a standard. There are actually four types of “targets” we can see in learning standards:

- **Knowledge Targets**–The facts and concepts we want students to know. Knowledge targets represent the factual underpinnings in each discipline. They are often stated using verbs such as knows, lists, names, identifies, and recalls. Ex. Know multiplication facts to 10
- **Reasoning Targets**–Students use knowledge and understanding to reason and solve problems. Reasoning targets represent mental processes such as predicts, infers, classifies, hypothesizes, compares, concludes, summarizes, analyzes, evaluates, and generalizes.
- **Process/Skill Targets**–Students use their knowledge and reasoning to act skillfully. Process/skill targets refer to those performances that must be demonstrated and observed, heard or seen, to be assessed. Knowledge targets always precede skill targets. Process/skill targets are also evidenced by the process being the most important aspect. Ex. Oral fluency in reading, driving with skill, playing a musical instrument.

- **Product Targets**– Students use their knowledge, reasoning, and skills to create a concrete product such as “creates tables, graphs, scatter plots, and box plots to display data, notates music, or creates a personal wellness plan.”

Here are the steps to deconstructing, or unpacking a learning standard:

1. Select standard or objective to unpack.
 - Highlight all of the verbs in the standard in red (circling or underlining works too)
 - Highlight all of the nouns in the standard in green
2. Look at the verbs and determine what type of target the standard represents:
 - Knowledge
 - Patterns of reasoning
 - Skills
 - Products
3. Use the nouns with the verbs to write understandable learning targets.
 - What targets are in this standard?
 - What key vocabulary do students need to know?
 - What key understandings do students need to have?
4. Stop and Reflect
 - Are all of the knowledge, reasoning, skills and products that students need to be successful listed? What else do students need to know, understand or be able to do to master this standard?
5. Write each target in student friendly “I Can,” “We Will,” or “I Will” language.

Let’s try an example. The ISTE Standards-T standard 5.b. below is “Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others.” Imagine it with the verbs in one color and the nouns in another:

Exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others.

This standard contains four targets:

 1. Exhibit leadership – This is a **process/skill target** because leadership must be observed or demonstrated to be assessed
 2. Demonstrate a vision of technology infusion – Having a vision for technology infusion assumes that the learner has **knowledge** of technology infusion, but it is also asking for the learner to demonstrate that vision, which is a **process/skill target**.
 3. Participate in shared decision making and community building – “Participate” and “community building” indicates a **process/skill target**, but note that a **reasoning target** is evident in “shared decision making.”
 4. Developing the leadership and technology skills of others – This is a **process/skill target** (developing leadership of others) that relies on a **knowledge target** (technology skills).

Our final step is to clarify these further, adding some specific information to help you see exactly how this standard “fits” this chapter content and the activities we will be undertaking in this course:

- We will demonstrate a vision of technology integration/infusion when we create individual lesson plans for our content area and grade level.
- Strong technology-infused lesson plans help us exhibit leadership as a teacher who knows current practices, tools, and instructional strategies.
- We will participate in shared decision making and community building as we work in Peer Teaching Teams to plan and deliver lessons.
- We will participate in developing the leadership and technology skills of others as we actively engage each week in class and with online resources.
- We will participate in community building as we curate technology resources to be shared via social media long after we complete this class.

Compare these bullet points to the standard above. Don't the standards make more sense when you deconstruct, or unpack, them? This is a very important skill you need to master as a teacher. Use the Making Sense of Standards worksheet to get to know the ISTE Standards-E, ISTE Standards-S, and Oklahoma Academic Standards in this course.

ISTE Standards-T

2. Design and Develop Digital Age Learning Experiences and Assessments

1. Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE-S.
 1. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
 2. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
 3. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
 4. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

5. Engage in Professional Growth and Leadership

1. Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.
 1. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations
 2. Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation
 3. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats

4. Contribute to the effectiveness, vitality, and self renewal of the teaching profession and of their school and community

FYI —

Assessment of Teacher Performance

Teacher Leadership Effectiveness (TLE) oversees Oklahoma's new teacher/leader evaluation system that is used to inform instruction, create professional development opportunities, and improve both the practice and art of teaching and leading.

Assessment of District and School Performance

- Office of Accountability Report Cards (<http://www.schoolreportcard.org/reports.htm>)
- Oklahoma's A-F Grading System FAQs (<https://sdeweb01.sde.ok.gov/Transparency/Docs/AfReportCardFaq.pdf>)

Key Terms

- formative assessment
- summative assessment
- performance assessment
- digital portfolios

Resources

Socrative <http://www.socrative.com>

Rubistar <http://rubistar.4teachers.org/>

TestMoz <https://testmoz.com/>

Kathy Schrock's Assessment and Rubrics page <http://www.schrockguide.net/assessment-and-rubrics.html>

Oklahoma State Department of Education – <http://ok.gov/sde/>

OSDE – A-F Report Card FAQ – <https://sdeweb01.sde.ok.gov/Transparency/Docs/AfReportCardFaq.pdf>

TLE Introduction Video – <http://vimeo.com/57015306>

Suskie, L. (2000). Fair assessment practices: Giving students equitable opportunities to demonstrate learning. In AAHE *Bulletin: Fair Assessment Practices*, (May 2000).

Professional education requirements as set forth by the Oklahoma Commission for Teacher Preparation (OCTP).

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Online Intelligence

Essential Questions

How does the personalization of social media and web search tools impact individuals?

What is a digital footprint and how can I manage mine?

What is the difference between the Surface Web and the Deep Web?

How can I get the best information from a Web search?

Being NetSmart

The digital culture we live in demands knowledge and skills in managing personal and professional information in public spaces — the Web and social media apps in particular. It is no longer an option to be a passive user of the Web and social media without being smart about your use of it and, frankly, its use of you. We use social media to share our lives with friends and Web search engines to locate web-based information and services, but how might these tools be using us? Rheingold (2012) explains

Google, Bing, Yahoo! And other search engines offer search as a free service on the Web, because searches provide the marketing information that advertisers have sought like the conquistadores sought El Dorado — a way to show large numbers of individuals advertisements that each person might actually be interested in. Search is both a public good — something useful to everybody, but that individuals lack sufficient incentive to create for themselves — and a way to amass significant private wealth by selling a valuable commodity. In Web search, the valuable commodity is the searchers' attention. Search engines sell sponsored links that appear on the top or side of the page of links displayed in response to a search query. Whenever someone clicks on a sponsored link, a small amount of money goes to the search engine provider. Those clicks add up to billions of dollars each year. (p. 85)

You are probably well-aware also of how marketing uses social media — to promote products, causes, candidates, services, and also to gather the valuable commodity of the users' attention. Is this a bad thing? Actually, no. These tools are just making use of a perfect marketing opportunity. The problem is when users are unaware of how the information they willingly provide is being used.

Rheingold (2012) advises “Awareness of your digital footprints and impacts of your digital profiles ought to precede your conscious participation online. Think before you post, because your digital actions are findable, reproducible, and available to people you don't know, and will remain available to all indefinitely” (p. 249). What is your digital footprint? Is it the one you intended to leave? The video below from Internet Society offers four reasons you should care about your digital footprint:



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=37#oembed-1>

Your digital footprint is comprised of information such as particular links you click on when using a search engine, groups you join, online shopping preferences, and reacting to someone else's social media post. How do you know what footprints you've left? Try these steps:

1. Search your name on a variety of different search engines. Search text, images, and video. If anything comes up that you would prefer not be attached to your name, take steps to remove it from the site it happens to be on. Don't hesitate to contact a webmaster if you need something taken off a particular site but have no way to do it.
2. Clean up accounts! You may have an old account somewhere that you haven't accessed since Jr. High that needs to be deleted. If you have accounts you plan to "deactivate," clean out all the photos and information before deactivating.
3. Check the privacy settings on your active accounts. Make a habit of going through your active accounts each year and clean them up. Anything you want to keep can be backed up on your hard drive without leaving it out and available within the app. Make sure you know what you are sharing and with whom you are sharing it. All social media apps' privacy settings require attention!
4. Unsubscribe from any mailing lists that you don't really need.
5. Use a secondary email account for sites you sign up on that may send marketing.
6. Check any e-commerce or retail sites and delete your account if you no longer use them.
7. Use a more private web browser and search engine. DuckDuckGo doesn't log any personally identifiable information, doesn't use cookies to identify you, and it discards user agents and IP addresses from its server logs. StartPage runs a Google search for you but does not pass your information on to Google. Most major browsers have a private, or incognito mode, but note this still tracks your IP address (see <https://www.computerhope.com/issues/ch001378.htm> for more information).
8. Always remember that digital information doesn't really go away, so think very carefully before you post! If you want to test how long web information remains available, search for a URL (like <http://okstate.edu>) on the Wayback Machine Internet Archive (<http://archive.org>).

There are serious privacy-related issues such as identity theft, surveillance, and behavioral data mining associated with web and social media activities, but there are great affordances for those who bring knowledge and skill to their engagement in digital culture. The wealth of outstanding information available, engagement in personal and professional communities, and the opportunity to collaboratively create with diverse, global citizens cannot be ignored. Rheingold explains, "Every PC as well as smart phone is a printing press, broadcasting station, political organizing tool, and site for growing a community or marketplace. Knowledge, power, advantage, companionship, and influence lie with those who know how to participate, rather than those who just passively consume culture" (p. 249).

It is ironic that we now enjoy such a high level of connectivity through the Web and social media, but the tracking of our personal data and activity actually brings a self-segregated experience to users (boyd, 2017). Watch this video to understand the effect of the filter bubble, or echo chamber, that is created for us based on our online activities:



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<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=37#oembed-2>

(For a series of additional videos on How to Pop Your Filter Bubble, see <https://www.youtube.com/watch?v=B8ofWfx525s&list=PLOGi5-fAu8bGbT40N1o65uMu9fHqAaojM>).

By functioning online within our own filter bubble, or echo chamber, we miss out on the chance to appreciate diverse perspectives and interact in a heterogeneous environment. Unfortunately, our society seems to be more polarized than ever. Do you think there's a connection here? Danah Boyd noted:

Thus, given the opportunity, people typically revert to situations where they can be in homogeneous environments. They look for “safe spaces” and “culture fit.” And systems that are “personalized” are highly desirable. Most people aren't looking to self-segregate, but they do it anyway. And, increasingly, the technologies and tools around us allow us to self-segregate with ease. Is your uncle annoying you with his political rants? Mute him. Tired of getting ads for irrelevant products? Reveal your preferences. Want your search engine to remember the things that matter to you? Let it capture data. Want to watch a TV show that appeals to your senses? Here are some recommendations. (n.p.)

Take notice of the ads that show up when you conduct a search. Are they connected to anything else you've reacted to on social media or searched for? Have a friend conduct the same search as you and notice the difference in the sponsored links and ads that appear. You should see individual preference data reflected in ads. This personalization of information comes at the price of your privacy and gives you a very narrow view of all available Web resources. Another limiting aspect to what you see on the Web is tied to common search engines. Search tools like Google or Bing index approximately 4% of all available web resources — just the surface. The deep web is the part of the Web that cannot be accessed by a general search engine. Consider how many great resources you're missing out on that common search engines are not showing you!

Deep Web

Different types of search engines to access more than just the surface web:

Name	Description
The Internet Archive	A database of older, saved versions of nearly every site ever created on the Internet (I can still get to the first website I ever made in 1992 on a server that has been dead and gone over two decades. Proof that digital information never dies)
USA.gov	Direct access to a wide variety of government-owned information and databases like the Library of Congress, the Smithsonian, and much more
Science.gov	Indexes over 60 databases and 2,200 scientific websites of the latest research
U.S. Geological Survey	Amazing maps and images and real (or near-real) time data and information on current conditions and Earth observations
Directory of Open Access Journals	Indexes and provides free access to high quality, open access, peer-reviewed journals
Voice of the Shuttle	A rich directory for online resources on literature, humanities, and cultural studies
RxList	A comprehensive database of US prescription medications
Infoplease	An information portal allowing you to tap into a number of databases, online journals, almanacs, ebooks, online library card catalogs, etc.
Pipl	People finder
MyLife	Search reputation scores and background
Social Catfish	People search by photo
Wolfram Alpha	A search engine based on computation and metrics
Dogpile	A metasearch engine
Yippy	A metasearch engine
DuckDuckGo	A deep web search engine that doesn't track your discoveries
Catalog of U.S. Government Publications (CGP)	Access to federal publications
The World DataBank	Collections of data on a variety of topics with an analysis and visualization tool
FactCheck.org	Check the accuracy of internet stories
Addict-o-Matic	Creates a topic page for searches using results from Bing, Google Blog Search, Twitter, YouTube, Flickr, WordPress, and other search & social sources. Bookmark the page on your browser to check on the latest results regularly.

Resources

Anatomy of a URL

WhoIs.com discover who owns a particular web address (search for <http://martinlutherking.org> and describe what you find)

How to Use Search Like a Pro <https://www.theguardian.com/technology/2016/jan/15/how-to-use-search-like-a-pro-10-tips-and-tricks-for-google-and-beyond>

10 Tips for Smarter More Efficient Internet Searching <http://www.techrepublic.com/blog/10-things/10-tips-for-smarter-more-efficient-internet-searching/>

Your Digital Footprint Matters <http://www.internetsociety.org/your-digital-footprint>

Simulator <http://simulator.com/> (Use this site to help students see how easy it is to create fake social media posts)

How Do Search Engines Work? <http://www.bbc.co.uk/guides/ztbjq6f>

Customized Google Search Engine <http://www.google.com/cse/?hl=en>

How to Create Your Own Google Custom Search Engine <http://www.youtube.com/watch?v=IeiFFpo8qME>

Digital footprint <http://thetechnoliterate.wordpress.com/2013/03/05/digital-footprint/>

Boyd, d. (2017). Why America is self-segregating

Rheingold, H. (2012). NetSmart: How to thrive online. Cambridge, MA: MIT Press.

Key Terms

The Social Media Glossary: 226 Essential Definitions <https://blog.hootsuite.com/social-media-glossary-definitions/>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Curating Open Educational Resources

Essential Questions

What is the difference between collecting and curating resources?
What are open educational resources (OER)?
How might educational websites provide interactive and engaging experiences for students?

Open Educational Resources (OER)

Open educational resources (OER) are free and openly licensed educational materials that can be used for teaching, learning, research, and other purposes. — Creative Commons

Open Education “...is the simple and powerful idea that the world’s knowledge is a public good and that technology in general and the Web in particular provide an extraordinary opportunity for everyone to share, use, and reuse knowledge.”

—The William and Flora Hewlett Foundation



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=39#oembed-1>

Video by Open Washington: Open Educational Resources Network (<http://www.openwa.org/>)

The U.S. Department of Education’s #GoOpen Campaign (see also #goopen) encourages schools and states to invest in openly licensed educational materials to transform teaching and learning.

Spend some time at OER Commons (<https://www.oercommons.org/>) to discover resources you might use. Realize the power of OER is not just that they are free to use but licensing under Creative Commons allows for re-mixing, re-using, and re-purposing of individuals’ creations.

The Creative Commons copyright licenses and tools forge a balance inside the traditional “all rights reserved” setting that copyright law creates. Our tools give everyone from individual creators to large companies and institutions a simple, standardized way to grant copyright permissions to their creative work. The combination of our tools and our users is a vast and growing digital commons, a pool of content that can be copied, distributed, edited, remixed, and built upon, all within the boundaries of copyright law. (<https://creativecommons.org/licenses/>)

Watch this video for more information on Creative Commons and fair use guidelines:








One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=39#oembed-2>

The process of selecting, organizing, and sharing OER, though, is critical for teachers to master.

Collecting vs. Curating

We have all collected web-based resources by bookmarking in a browser to be able to visit them later. This is collecting – saving something for our own use and enjoyment. Curating is a bit different. When we curate, we are thinking critically about resources, considering how they can be used in a specific context, and purposefully sharing them with others. Annette Clancy explains “Collection is additive. Curation is subtractive. Collecting is for yourself, curating is for others.” Nancy White shares a chart illustrating the differences between these two activities:

Criteria	Collecting	Curating
 Thinking Level	Classifying	Critical Thinking · Synthesis · Evaluation
 Process	Limited depth · Somewhat random	“Cherry-picked” · Reading · Synthesizing · Interpreting · Evaluating for theme & context · Disciplined · Purposeful · Continuous process of inquiry
 Organization	Thematic	Thematic AND Contextual · “Real-World” use & examples · Tells a story
 Value	Meets personal interest · Value to collector · Quantity matters	Meets a learning goal · Value to collector AND other learners · Personal connection · Quality matters
 Audience	Not necessarily shared	Arranged, annotated, published · Available to the general public for comment and discussion

Differences between collecting and curating resources arranged by criteria

“A curator is an expert learner. Instead of dispensing knowledge, he creates spaces in which knowledge can be created, explored, and connected.” (Siemens, 2007).

Types of Curation Tools

Social Bookmarking – You probably already keep bookmarks of your favorite websites to go back to whenever you might need them. Social bookmarking takes it a couple of steps further, allowing you to access your bookmarks from any internet-enabled device, organize resources in a searchable manner by tagging, and share your bookmarks with individuals and groups who share your interests. In this course, you are getting to know the social bookmarking tool Diigo well, as we are posting, tagging, and sharing resources with our EDTC 3123 group. In the Resources section of this chapter, there are links to more social bookmarking tools you might like to try.

OER Commons – OER Commons offers a digital library and network of resources curated by educators.

Standards Connector – A Standards Connector is a collection of digital resources that is specifically organized based on a set of standards.

Types of Websites

Archival and Primary Source websites – A type of educational website that provides original historical materials for students to access and analyze.

- Example: National Archives <http://www.archives.gov/education/>
- More to Explore: Kathy Schrock's Guide To Everything: Primary Sources <http://www.schrockguide.net/primary-sources.html>

Collaboration websites – Communicate and collaborate with others around the world in order to create students who are competitive and globally-minded

Educational websites – A source of Internet-based digital content, often designed with K-12 learning goals in mind.

- Example: National Geographic Kids <http://kids.nationalgeographic.com>
- More to Explore: Internet Public Library <http://ipl.org/div/subject/> An index of educational websites selected and evaluated by educators and librarians.

Exploration and Discovery websites – A type of educational website that allows students to engage in online explorations of topics of interest.

- Example: Exploratorium <http://exploratorium.edu/>
- More to Explore: Discovery Education <http://www.discoveryeducation.com/> Now offers digital textbooks along with their other educational content.

Lesson Plan websites – A type of educational website featuring lesson plans and related teaching materials.

- Example: Read Write Think <http://www.readwritethink.org/>
- More to Explore: Curriki <http://www.curriki.org>

Real-time and Recorded Data websites – A type of educational website that presents scientific data for students to access and analyze.

- Center for Innovation in Engineering and Science Education <http://ciese.org/realtimedatasites.html>

Skills/Practice websites – A type of educational website that provides basic learning activities for students.

- Example: Starfall <http://starfall.com>
- More to Explore: Purpose Games <http://www.purposegames.com/>

Student-to-Experts websites – A type of educational website that supports exchanges of information between students and adult experts in organizations outside of school.

- Example: Ask Dr. Math <http://mathforum.org/dr.math/>

Virtual Field Trip websites – Online learning adventures where students are able to visit far-away places using their classroom computers.

- Example: TripLine <http://www.tripline.net/>: Create a virtual map of different areas of the world and explain them. This is a good resource for History and Literature classes.
- More to Explore: Smithsonian Museum of Natural History <http://www.mnh.si.edu/vtp/1-desktop/>
- Google's Field Trip App <https://www.fieldtripper.com/>
- Google Cultural Institute–Discover exhibits and collections from museums and archives all around the world. Explore cultural treasures in extraordinary detail, from hidden gems to masterpieces. <https://www.google.com/culturalinstitute/home>
- How to Create Your Own Virtual Tour on Google Earth <http://www.makeuseof.com/tag/how-to-create-your-own-virtual-tour-on-google-earth-with-a-kml-file/>

ISTE-T Standards

2. Design and Develop Digital Age Learning Experiences and Assessments

- Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE-S.
 - Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
 - Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
 - Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
 - Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

3. Model Digital Age Work and Learning

- Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.
 - Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations

Key Terms

bookmarking
interactive video conferencing
social bookmarking

Resources

Social Bookmarking and Standards Connectors

TES Teach with Blendspace <https://www.blendspace.com/>

LiveBinders <http://livebinders.com> Organize your favorites into “binders” with tabs and sub-tabs and share or embed those binders.

Pinterest <http://pinterest.com> Pinterest is a site where you can “pin” (or collect) photos you find on the internet. The photos link to the webpage or blog post where the photo is located, so you can read more about it.

Standards Toolbox <https://edshelf.com/tool/standards-toolbox/>

Symbaloo <http://symbaloo.com> Is a highly customizable graphic page with “tiles” creating a “webmix.” Share your webmix or use those others have put together.

Learning or Classroom Management Systems

Collaborize Classroom <http://technologiesforteaching.weebly.com/collaborize-classroom.html> Complements classroom instruction and engage students in online activities, assignments and discussions that allow for deeper participation inside and outside the classroom.

Coursesites <https://edshelf.com/tool/coursesites/> Online course creation and facilitation service that empowers individual K–12 teachers, college and university instructors and community educators to add a web-based component to their courses, or even host an entire course on the Internet.

Rcampus <http://www.rcampus.com/Comprehensive Education Management System> and a collaborative learning environment.

Class Dojo <http://www.classdojo.com/about> A classroom management system that digitally tracks students’ behavior using avatars and by giving/taking points.

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Using Technology Resources in Different Learning Environments

Essential Questions

How do you integrate technology in a classroom that has very little technology?
What about different configurations of computer technology in the classroom?
How do you find iPad apps to use in the classroom?
What are some of the newest learning technologies that could change teaching and learning?

Learning Environments

There are a variety of different learning environments you may find yourself teaching in — from a one-computer classroom, to a computer lab down the hall, to each student having a tablet computer of their own. The table below offers information about a variety of learning environments:

	Description	More Information
One Computer Classroom	<p>The classroom has one computer for all activities: presentations, student group work, learning centers.</p> <p>Biggest challenge: Not enough individual time for each student.</p>	<p>How to Thrive – Not Just Survive – In a One Computer Classroom http://www.educationworld.com/a_tech/tech/tech092.shtml</p>
Stand-Alone Lab	<p>The teacher schedules time in one room for the students to each use a desktop computer.</p> <p>Biggest challenge: Scheduling. Without technology at hand in the classroom, it cannot be used for just-in-time learning.</p>	<p>The Pros and Cons of Computer Labs http://www.edutopia.org/blog/pros-cons-computer-labs-mary-beth-hertz Classroom Management Tips for the School Computer Lab http://thecornerstoneforteachers.com/free-resources/technology-integration/managing-a-computer-lab</p>
Mobile Laptop Lab	<p>Students each use a laptop from a rolling cart used to transport and recharge laptops.</p> <p>Biggest challenge: Scheduling the cart; keeping batteries charged from class to class.</p>	
1:1 (One-to-One Computing)	<p>The school purchases and issues a computing device (typically laptop or tablet) to each student. Teachers support learning with Internet-based resources and activities.</p> <p>Biggest challenge: cost and support of hardware.</p>	<p>5 Common 1:1 Teacher Mistakes http://gowhereyougrow.wordpress.com/2012/12/13/5-common-11-teacher-mistakes/</p>

<p>B.Y.O.D. (Bring Your Own Device)</p>	<p>Students bring whatever Internet connected mobile device they have to school, and teachers support learning with Internet-based resources and activities.</p> <p>Biggest challenge: supporting a wide variety of platforms.</p>	<p>Ten Reasons to Consider BYOD in Education</p> <p>http://www.teachthought.com/technology/10-reasons-to-consider-byod-in-education/</p> <p>On Board with BYOD http://www.ascd.org/publications/educational-leadership/oct12/vol70/num02/On-Board-with-BYOD.aspx</p> <p>The Hidden Costs of Wireless Computer Labs https://thejournal.com/articles/2005/08/01/the-hidden-costs-of-wireless-computer-labs.aspx</p>
<p>Flipped Classroom</p>	<p>The flipped classroom is one in which the students' homework is to watch or listen to the teacher's lecture or presentation via technology, so classroom time can be used for hands-on, active learning.</p>	<p>EducationNext: The Flipped Classroom</p> <p>http://educationnext.org/the-flipped-classroom/</p>

Regardless of which of the above learning environments you find yourself teaching in, finding and evaluating software will be critical. The next section will introduce you to resources to assist you in finding and evaluating software applications.

Finding and Evaluating Software Applications

Regardless of what hardware you happen to have in your classroom, you will need to know where to find and evaluate the best applications. For general electronic learning resource evaluations, we love Graphite from Common Sense Media (<https://www.commonsense.org/education>) and the California Learning Resource Network (<http://www.clrn.org>). On the Electronic Learning Resource site, you can browse resources by subject area and grade level and read summaries and reviews by educators.

For iPad apps, you'll want to check out Graphite by Common Sense (<https://www.graphite.org/reviews>). This directory provides app reviews from Apple Distinguished Educators. Kathy Schrock provides *Bloomin' Apps* (<http://www.schrockguide.net/bloomin-apps.html>), a website with recommended iPad apps organized according to Bloom's Taxonomy. She also provides two excellent resources for evaluating apps designed to provide content and for apps designed for creation of a product.

ISTE-T Standards

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 - Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
 - Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
 - Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
 - Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

4. Promote and Model Digital Citizenship and Responsibility

- Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.
 - b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources

Key Terms

1-to-1

BYOD

one-computer classroom

laptop lab

mobile learning

Resources

Graphite Top Picks <https://www.common sense.org/education/top-picks#%2Ftop-picks>

California Learning Resource Network <http://clrn.org>

Johnny Lee's TED talk on hacking technology for your classroom http://www.ted.com/talks/johnny_lee_demos_wii_remote_hacks

Kathy Schrock's iPad Resources

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Lesson Makeover

Choose the lesson linked below that best matches the grade level/content area you intend to teach. Each of these have been selected from Teachers' Edition textbooks that you will be likely to be handed as a classroom teacher. Your job is to do a thorough **makeover** of the lesson, **transforming it into an innovative, differentiated lesson that integrates technology and thoroughly engages your students.**

1st Phonics

2nd Reading

3rd Health

3rd Science

4th Reading

4th Spelling

7th Civics

8th Grammar

8th Science

10th Literature

HS Agriculture (turn this into a lesson appropriate for Ag I)

HS American History

HS Art

HS Biology

HS Careers

HS Health

HS World Geography

MS Math

Spanish 3

Communication and Collaboration with Parents and Students

Essential Questions

What are communication and collaboration technologies?
As a teacher, how can I use communication and collaboration technologies to improve student learning in my classroom?

Whether it is teacher-to-parent, teacher-to-student, student-to-student, or parent-to-parent communication, you will want to have the best possible options available when you are a teacher. Undoubtedly, the school district you work for will provide you with an **email** account, which should be kept professional and totally separate from your personal email account.

You might ask parents for their email addresses and create a mailing group or listserv. Many people prefer to communicate via text, and you may want to check out a free service that allows you to send and receive texts with parents and students but neither your actual number nor theirs will be shared. These services (see Remind 101, Celly, GroupMe, or SendHub) typically allow you to send messages from your phone, email, or a website.

A teacher might also maintain a **website** for parents to stay up-to-date with what is going on in their students' classroom. Many schools have a content management system in place for teachers to maintain a website for which he/she is the sole editor and changes are not made often. A **blog** could be used in a situation where the teacher plans to update information often and allows for parents and students to comment. A **wiki** is used when the web-based writing is done collaboratively. For example, a group of teachers at a particular grade level might want one site they all can contribute to.

Classroom Blog Examples:

InfoTech with Mr. Losik <http://mrlosik.blogspot.com/>

The Year 3/4 Smarties <http://thesmarties2.blogspot.com/>

Mrs. Cornejo's Class Blog <http://mrscornejosclassblog.blogspot.com/>

Mrs. Caudill's Classroom Connection <http://mrscccc.edublogs.org/>

Mr. Robbo, The P.E. Geek <http://thepegeek.com/>

Fairview Physical Education – Be Heart Healthy! <http://fairviewpe.blogspot.com/>

Classroom Wiki Examples:

Mrs. Anderson's Grade 2 Wiki <http://mrsanderson10.pbworks.com/w/page/33263525/FrontPage>

Healigan's House <http://healigan.blogspot.com/>

Classroom Website Examples:

Memorable Math with Ms. Napolitano <http://cnapolitano.weebly.com/>

Instagram in the Classroom

10 Surprising Ways to Use Instagram in the Classroom <https://www.weareteachers.com/10-surprising-ways-to-use-instagram-in-the-classroom-2/>

Three Reasons Your Students Should Own Your Classroom's Instagram and Twitter Accounts <https://www.edsurge.com/news/2016-02-03-three-reasons-students-should-own-your-classroom-s-twitter-and-instagram-accounts>

Using Instagram as a Classroom Tool <http://www.nerdynerdynerd.com/2014/06/using-instagram-as-classroom-tool.html>

Instagram in the Classroom Pinterest Board <https://www.pinterest.com/uhighlibrary/instagram-in-the-classroom/>

Collaboration Tools

Collaboration goes beyond just communication. Collaboration tools allow you to share, or work together on, different types of media. Many of these tools function like the course management systems you have experienced (D2L, Blackboard, Moodle, etc.).

You might create an online space for your students to get homework help online, participate in discussion, share documents, or engage in research with other classrooms around the world. The following tools allow you do these types of activities:

Collaborize Classroom <http://www.collaborizeclassroom.com>

Gooru <http://www.goorulearning.org> Create collections of web resources and quizzes for your students or use collections created by other teachers.

Google Apps for Education <http://www.google.com/enterprise/apps/education/>

ISTE-T Standards

3. Model Digital Age Work and Learning

- Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and

digital society.

- a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations
- b. Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation
- c. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats
- d. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning

Resources

Weebly <http://education.weebly.com>

Wix <http://wix.com>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Innovative Pedagogies

Essential Questions

What is innovative pedagogy?
What is a flipped classroom?
What is gamification?
What is SOLE?
What are some ways to make the way content is presented innovative?
What makes innovative pedagogy an effective way of learning in the classroom?

Many of you are familiar with the dictionary definition of pedagogy: the method and practice of teaching, especially as an academic subject or theoretical concept. Sounds great! But, what does this definition mean? How does this relate to me and my teaching? Let's dig deeper!

This chapter is designed to further develop your pedagogy as a teacher, and develop skills for innovative pedagogical practices.

Innovative Pedagogy in Action

Think back to Chapter 3: Instructional Design. We learned that Instructional design is the practice of creating “instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing” (Merrill, et al., 1996). We have selected three methods of instruction that we feel are particularly innovative in educational technology: Flipped Classroom, Gamification, and Self-Organized Learning Environment (SOLE).

Flipped Classroom

A flipped classroom is just as it sounds: doing what is done in class at home, and doing what is done at home in class. Let's break it down. In a classroom setting, the instructor typically presents material and assigns homework based off of that material. In a flipped classroom model, instructional material is given in reading material or videos and done at home, which leaves in class time for the students to engage in active learning (Herreid & Schiller, 2013). In their article, Herreid and Schiller (2013) stated “A guiding principle of the flipped classroom is that work typically done as homework (e.g., problem solving, essay writing) is better undertaken in class with the guidance of the instructor. Listening to lecture or watching videos is better accomplished at home”.

There are many advantages of a flipped classroom (Herreid & Schiller, 2013):

- Allows students to move at their own pace

- Doing “homework” in class can give teachers better insight into student difficulties and learning styles
- Teachers can more easily customize and update the curriculum and provide it to students 24/7, and use of technology is flexible and appropriate
- Classroom time can be used more effectively and creatively
- Can increase student achievement, interest, and engagement

Now, let’s see this concept in action! The video below is an example how a teacher introduces a flipped classroom model to their students and their parents:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=47#oembed-1>

Now let’s view an example of a lesson:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=47#oembed-2>

Jon Bergmann’s blog also has some excellent examples and resources.

Gamification

Playing games in the classroom? Yes, yes, and yes! Gamifying your classroom can be extremely fun and a perfect learning opportunity for students. Gamification is “the application of typical elements of game playing (e.g., point scoring, competition with others, rules of play) to other areas of activity.” You’re all familiar with gamification in business — think about how many points you earn at Aspen Coffee or Fuzzy’s Tacos? How many of you are earning Pocket Points right now?

Watch how this science teacher made learning science a game:



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=47#oembed-3>

Paul Anderson’s videos and website are great examples of how to gamify your classroom (he is also known for his flipped classroom videos!) Paul Anderson’s TEDtalk is such a great resource for learning about innovative technologies and instructional pedagogies. He talks about how schools should be FUN and that failure is OK – that it is part of the learning process. Further, he discusses how students learn at different “levels” and that they should be enabled to “up” their levels. Hence, his drive to reinvent his class as a videogame. He took the most compelling elements of gaming and

then applied it to his classroom.

Alice Keeler's articles on Getting Started with Gamification and Gamification of the Classroom are great tools to getting started!

A more thorough framework comes from Yo-kai Chou. His TEDtalk provides foundational strategies for gamification. He describes his octalysis framework and how to gamify your classroom.

Michael Matera's, *EXplore like a Pirate*, is an excellent example of how to gamify a classroom.

Self-Organized Learning Environment (SOLE)

Self-organized learning environment (SOLE) was developed as a method of learning by Sugata Mitra. Mitra was inspired by several theories centered on constructivism, child development, and social cognitive growth (Mitra et al., 2005; Inamdar, 2004; Mitra, 2003, 2004, 2014; Piaget, 1957; Vygotsky, 1978), and the belief that “students will learn through exploration, collaboration, and curiosity” (Schwark, 2017).

SOLE is:

Student Driven

- Students are motivated by choice and interests
- Students drive process

Collaborative

- Students learn socially
- Students collaborate in the process

Curious

- Encourage innate sense of wonder
- Curiosity helps construct understanding

Open-Minded

- Students are open minded
- Instructor is open minded

Transformative

- Critical thinking is paramount

Encouraging

- Effective educators are encouraging

Patient

- Effective educators are patient

SOLE Sessions

Self-Organized Learning Environment is a learning environment that fosters collaboration, innovation, and creativity through the internet. Learners organize themselves into groups, while also having the freedom to jointly use resources and move around or migrate to another group, all with limited instructor intervention. Each session begins with a “big question” posed by the instructor, one that is intended to spark students’ sense of curiosity, wonder, or intrigue.

Toward the end of a session, the learners share what they learned and reflect on the process (Mitra, 2014; “School in the Cloud”, 2016). Mitra (2014) stated, “In a SOLE, children seem to create and maximize meaning out of the information content of what they are researching” (p. 556). Below is a typical timeline for a SOLE session:

First 5 Minutes: Questions

- Pose a “big question”
 - The question will be framed as a genuine process of discovery in order to promote curiosity
- Explain the SOLE Process

30-45 Minutes: Investigation

- Students work in student formed groups to find answers to the big question online. During this time, students explore the big question collaboratively, while the instructor provides encouragement and facilitation.
- The instructor should encourage students to resolve any group issues themselves.
- Students are encouraged to collaborate within their group or move around to other groups.
- Few rules are given to the students, and this lack of rules enables children to change groups, talk to each other and other groups, and walk around to observe their peers’ work.

10-20 Minutes: Review

- Invite the students to share their stories of collective discovery. Talk about similarities/differences between their answers, help to see links to other areas.
- Encourage debate. Facilitate discussion about the question and investigative process
- Engage the students in their own review: What would they do differently next time? What do they think others did well?

The developing of a “big question” is extremely important! The “big question” is described as, “ones that don’t have an easy answer. They are often open and difficult; they may even be unanswerable. The aim of them is to encourage deep and long conversations, rather than finding easy answers” (“School in the Cloud”, 2016). Keep in mind, as the instructor you are trying to elicit critical thinking, collaborative work, and discovering theories throughout the children’s learning process and provide connections across content areas. School in the Cloud provides an excellent outline and examples for you to get started.

You may want to start with simple questions. These may include:

- Where is.....?
- Who is.....?
- What is the largest animal in the world?
- What makes trees green?
- What makes the sky blue?

Some harder questions may be introduced as children get more comfortable answering simple questions, or if they’re

already proficient with search and language, you can start asking some tougher questions that don't have such a direct answer.

These should encourage children to explore a wider topic, connect a number of subjects, and develop a deeper understanding of their answer. It's the difference between "What is the largest animal in the world?" and "Why are there no animals bigger than a blue whale?" ("School in the Cloud", 2016)

There are really no limits to what a Big Question can be, as long as it is thought-provoking and captures children's attention. Below is a list of Big Questions organized by Learning Objective or Topic that will help you get started:

Digging deeper into science concepts

- What would happen to the Earth if all insects disappeared?
- Is life on earth sustainable?

Introducing new math concepts

- What are fractals?

Investigating and understanding historical facts

- Who built the pyramids and why?

Abstract thinking concepts

- Can trees think?
- Does a frog know it's a frog?
- Can you kill a goat by staring at it?
- Will robots be conscious one day?

Developing an understanding of key concepts in a contextual setting

- What is technology?

Remember, "the questioning provides opportunities for students to explore a variety of sources, extrapolate different answers, and challenge one another. A key aspect of the big questions is that the purpose is not to discover the 'right' answer, but rather to develop methods and skills that are transferable and applicable" (Schwark, 2017).

ISTE Standards

1. Facilitate and inspire student learning and creativity

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

- a. Promote, support, and model creative and innovative thinking and inventiveness
- b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources
- c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes
- d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments

2. Design and Develop Digital Age Learning Experiences and Assessments

Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE:S.

a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity

b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress

c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources

d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

Key Terms

Flipped Classroom

Self Organized Learning Environment (SOLE)

Gamification

Innovative teaching

Resources

FLIPPED CLASSROOM

Edsurge – What, Why, and How to Flip Your Classroom

Edsurge – Six Ingredients for Sweetening Your Flipped Classroom Recipe

Pinterest: Flipped Classroom

Upside Down and Inside Out: Flip Your Classroom to Improve Student Learning

GAMIFICATION

Pinterest: Gamification

Google Plus: Gamification in Education

Facebook: Gamification for Education Group

Yu-kai Chou What is gamification?

Yu-kai Chou's Octalysis Framework

Alice Keeler's guide to Getting Started with Gamification

Alice Keeler's guide to Gamification of the classroom

Free Badges

SOLE

Sugata Mitra's TedTalk

The Hole in the Wall Project

Applying SOLE to the Classroom

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Digital Media Production

Essential Questions

What types of digital media production activities could students do at particular grade levels?
How can digital media technologies best be used to improve student learning?
What are the steps to creating a digital media project?
What is digital storytelling?
What are the four points of fair use that help me meet guidelines?

Why Teach Creativity

Csikszentmihalyi (2006) noted “creativity is no longer a luxury for the few, but . . . a necessity for all” (p. xviii). The world of education appears to agree, as a variety of 21st Century Learning Skills have included concepts such as “thinking and problem-solving skills,” “inventive thinking,” “high productivity,” “using digital technology and communication tools,” and “learning academic content through real-world examples” in their standards.

In *Tough Choices or Tough Times* from the National Center on Education and the Economy, McWilliam (2008) explained “the 21st century is a world in which comfort with ideas and abstractions is the passport to a good job, in which creativity and innovation are the keys to the good life, in which high levels of education – a very different kind of education than most of us have had – are going to be the only security there is” (p. 67). As teachers, how can we bring this “very different kind of education” to our classrooms? Multimedia production in the classroom offers significant opportunities for students’ creative expression.

Copyright and Fair Use Guidelines

Watch the following video explaining copyright and fair use. Pay close attention to the four points of fair use, as this is what helps you make a decision on whether you can use something within the guidelines.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://open.library.okstate.edu/applicationsofeducationaltechnology/?p=49#oembed-1>

Animation by Common Sense Media (<https://www.common sense media.org/>)

Digital Media Production

This week, each of you will produce an educational video! As you work on this project, think about using multimedia as a teacher (instruction) and as a student (sharing knowledge).

Consider the following questions:

- How can multimedia technologies best be used to improve student learning?
- How can teachers and students make their own classroom digital video productions?
- What is digital storytelling?

Using Digital Media Technologies to Improve Student Learning

Combining multiple media – text, voice, data, still image, video – in a single application of technology can help students learn better since they are receiving information in more than one form. Research shows that students learn best in situations that involve multimedia, simulations, modeling, and student-to-student interaction. Meaningful interaction is the key. Consider the following examples:

Classroom A	Classroom B
A chemistry teacher shows a video of an experiment and then has students conduct the experiment individually.	A biology teacher connects his class with marine biologists on the Journey North online project where they can ask expert biologists questions, track migration patterns using data provided from around the globe, and collect their own local evidence of spring migration. Student groups produce video documentaries of migration patterns.
An English teacher shows a DVD of poets reading poetry aloud and gives the students a test over their knowledge of different poetry styles.	An English teacher has students select their favorite video of a poet reading his/her own work on http://poetryfoundation.org . They create a new video of the same poem with the student reading and selected creative commons images to illustrate their interpretation of the poem.
At the end of the school year, a 1st grade teacher is pleased with how well her students are reading.	A 1st grade teacher has students record each other reading aloud at the beginning, middle and end of year. Parents are sent the edited videos showing their children's progress.

In which of these scenarios do you believe you would learn better, Classroom A or B? As a teacher, you would probably enjoy Classroom B a great deal more as well! The key to successful student multimedia projects is allowing them to share their creativity—*don't* give them too many rules or procedures. Give them creative freedom and let them surprise you!

Digital Media Production in the Classroom

There are three distinct phases to the media production process:

1. Pre-production & storyboarding: idea generation; research; location ideas (interior/exterior); script writing; create a shot list; gather crew, talent (family, friends, & roommates will love being in your video!), equipment, props
1. Production – shoot everything on your shot list, record all audio needed
1. Post-production – editing, creating graphics, finalizing

There are some excellent online tools to walk your students through each of these processes!

- Kids' Vid (<http://kidsvid.4teachers.org/>)
- Storyboard That! <http://www.storyboardthat.com/storyboard-creator>
- Storyboarding apps for writers and multimedia <http://www.teachthought.com/apps-2/11-storyboarding-apps-organize-inspire-young-writers/>

Your video will need to be educational—the list below offers some basic ideas for having your students move from media consumers to media producers:

Ideas for Video Production Assignments		
• "A Day in the Life . . ." video	• advocacy for a social concern	• biographies
• career profiles	• community history	• conversation with "future you"
• documentary	• fable or fairy tale retelling	• field trip documentation
• "how to" video	• introduction or orientation	• investigative
• "movie trailers" for books	• news and social events	• news cast
• plot synopsis in 60 seconds	• public service announcements	• skits and spoofs
• stop motion animation	• television commercials	• travel and tourism
• video pen pals	• video report	

Tips & Tricks for Filming in the Classroom

(adapted from <http://langwitches.org/blog/2010/09/01/a-few-tips-tricks-for-student-filming-in-the-classroom/>)

- Hold the camera with two hands to keep it steady. Suggest that you videographer lean against a wall, desk or chair
- Wait a few seconds after pressing the “record” button to start talking
- Make sure the microphone is on the camera
- Stay close to the source of the sound
- Be conscious of the noise going on in the background
- Take short clips
- Avoid running the camera for several minutes at a time
- Try to have “logical” breaks between clips: a new question, new topic
- Take both close ups as well as “panorama” shots
- Move in and out to achieve close ups and far away shots
- Try not to use the zoom – it can make the footage fuzzy
- Don’t film against a sunny window
- Know what is in your background
- Make sure there are no other groups of students shooting in your background
- Don’t film a distracting background
- Don’t include students who do not have media release permission
- Don’t identify students by filming something with their first and last name on it

Digital Storytelling

Digital Storytelling is just what it sounds like: telling stories using digital tools, or combining the art of telling a story with multimedia tools and sharing them in a digital space. The plus of bringing digital storytelling into the classroom is that kids are naturally good at storytelling, and it is a practice that fits each content area: science, social studies, math, language arts, physical education, music, etc.

Check out some of the great examples from the *Educational Uses of Digital Storytelling* website (http://digitalstorytelling.coe.uh.edu/example_stories.cfm). Richard Byrne (<http://www.freetech4teachers.com/> or @rmbyrne) offers a free downloadable book with great examples of real

teachers using digital storytelling in their classrooms: http://brandietrent.weebly.com/uploads/8/8/2/1/8821291/digital_storytelling_descprition_and_resources1.pdf

Another great read is *The Science of Storytelling: Why Telling a Story is the Most Powerful Way To Activate Our Brains*

ISTE-T Standards

2. Design and Develop Digital Age Learning Experiences and Assessments

- Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the ISTE:S.
- a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
- b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
- c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
- d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

3. Model Digital Age Work and Learning

- Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.
- a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations
- b. Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation
- c. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats
- d. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning

Key Terms

multimedia

digital storytelling
Fair Use Guidelines for educational multimedia

Resources

How to Upload Your Video to YouTube <http://www.business2community.com/youtube/upload-video-youtube-start-finish-0965736#egYVxYzjhSwoSPUW.97> Examples of videos in previous classes <https://www.youtube.com/playlist?list=PLARo5mKVT2sCABAZkdwNRbnBg-3SjnLRi> Movie <http://www.apple.com/ilife/imovie/>
Windows Movie Maker <http://windows.microsoft.com/en-US/windows-live/movie-maker-get-started>
Kids Vid Storyboard <http://kidsvid.4teachers.org/>
Lego Comic Builder <https://legosystem.comic.studio/?lang=en>
Storyboard That! <http://www.storyboardthat.com/storyboard-creator>
Storyboarding apps for writers and multimedia <http://www.teachthought.com/apps-2/11-storyboarding-apps-organize-inspire-young-writers/>
Story Collider: Stories about Science <http://storycollider.org/>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Project Based Learning

Teaching and Assessing Creativity

Can creativity be taught? Absolutely! Above you've seen the characteristics associated with creativity, and I'm sure you'll agree these are traits that can be encouraged and developed. This section of the chapter will introduce you to activities to use in the classroom to grow creativity.

The Torrance test for creativity includes measuring four components of creativity: fluency, flexibility, originality, and elaboration in thinking.

Component of Creativity	Explanation	Activities to Encourage this Component of Creativity
Fluency	the ability to generate quantities of ideas	Name everything you can think of within a specific category (the goal is to generate the longest list)
Flexibility	the ability to create different categories of ideas, and to perceive an idea from different points of view	Name all the things you can think of that have a certain characteristic (wheels, for example), or come up with a list of ideas for the perfect bathtub (the goal is create different categories of ideas and perceptions from different points of view)
Originality	the ability to generate new, different, and unique ideas that others are not likely to generate	Come up with the most outrageous solution for a particular dilemma (the goal is to come up with the most unique idea)
Elaboration	the ability to expand on an idea by embellishing it with details or the ability to create an intricate plan	Take an existing idea and elaborate further (the goal is to embellish the most)

The Gifted Child Today article “Creative Thinking in Schools: Finding the ‘Just Right’ Challenge for Students” provides the following suggestions for teachers trying to incorporate more creativity into their lesson plans:

- Diversity and large volumes of ideas and work increase the chance for creative outcomes, so encourage students to generate lots of work, and give them the appropriate tools they need to develop this work. Free students from busy work, lots of worksheets, DVD watching, etc. in order to get them working on projects and generating solutions.
- Teach the value of hard work and discipline in finding solutions, solutions that make sense and aren’t simply nonsensical or impractical. The ability to decipher good ideas from bad ones is an essential part of the creative process, and a skill that also should be taught.
- Encourage risk taking, and discourage perfectionism. Establish an environment that shows students that sometimes ideas fail, but the effort wasn’t wasted. Ensure that integrity is maintained during successes and failures.
- Provide strategies for managing group dynamics, such as discussing with groups the possible difficulties that could arise, and how to troubleshoot those situations. Give the students a signal to inform the teacher when they need advice or mediation.
- Set up a rubric for the final evaluation of projects and assignments. Guidelines, expectations, and goals should be a part of every project.
- Layer independent study with group study, and give older students the option of working with students in younger grades.
- Teachers should model creative thinking in how they make decisions, solve problems, and how they approach their instruction and guidance.
- Encourage divergent thinking by providing students with nonconventional tools and supplies. For example, instead of using traditional art supplies, bring in objects that seem bizarre or out-of-the ordinary, and let kids create with these items.
- Lessen the amount of extrinsic awards, such as stickers, special privileges, or an emphasis on the final grade. Creativity researchers have shown that extrinsic awards actually reduce creativity. Instead, encourage intrinsic satisfaction by providing all the guidelines, materials, time, and space students need to complete projects and assignments.
- Allow time for student feedback sessions, and encourage responsible and productive critiques from all students.
- Show exceptional work in libraries, hallways, even in community buildings and businesses.
- Teachers that expect great things from students will receive great things.

Project Based Learning

Project-based learning (PBL) is a comprehensive perspective focused on teaching by engaging students in investigation. Within this framework, students pursue solutions to nontrivial problems by asking and refining questions, debating ideas, making predictions, designing plans and/or experiments, collecting and analyzing data, drawing conclusions, communicating their ideas and findings to others, asking new questions, and creating artifacts. (Blumenfeld, et al., 1991)

PBL has students creating a product for an authentic audience to solve an authentic problem. This type of learning environment integrates knowing and doing. Students learn knowledge and elements of the core curriculum and apply what they know to solve authentic problems and produce results that matter. PBL students take advantage of digital tools to produce high quality, collaborative products. PBL refocuses education on the student, not the curriculum—a shift mandated by the global world, which rewards intangible assets such as drive, passion, creativity, empathy, and resiliency. These are activated through experience. (Markham 2011)

The keys to project-based learning are students solving authentic problems and producing a product as a solution. Note in Blumenfeld's description how many of the skills match those discussed above in the section on creativity and innovation.

Give YouTube a quick search for videos from Edutopia, Common Craft and Alan November. There are several that offer a great overview, and you might find some others that interest you as well. Some good searches to try would include 'an introduction to project-based learning', 'project-based learning explained', and you're likely to really enjoy the Alan November TED Talk 'Who Owns the Learning'.

Crucial Components of a Project-Based Learning Experience

- **Need to Know** – The idea here is to go WAY beyond “because it’s on the test.” The entry event can be almost anything: a video, a lively discussion, a guest speaker, a field trip, or a piece of mock correspondence that sets up a scenario. In contrast, announcing a project by distributing a packet of papers or assigning whatever is at the end of the chapter in the textbook is likely to turn students off.
- **Driving Question** – A good driving question captures the heart of the project in clear, compelling language, which gives students a sense of purpose and challenge. The question should be provocative, open-ended, complex, and linked to the core of what you want students to learn. It could be abstract (Is all really fair in love and war?), concrete (How safe is the water we drink?), or focused on solving a problem (How can we create an eco-friendly house?).
- **Student Voice and Choice** – The more student voice and choice, the more meaningful to the students! Choice and voice may range from selecting a particular topic from the general topic to choosing from a menu of products, to students making all decisions from topic to resources, to final product.
- **21st Century Skills** – Collaboration, communication, critical thinking, use of technology, an important purpose
- **Inquiry and Innovation** – Students generate additional questions and hypotheses related to the driving question. The classroom culture should value openness to new ideas and new perspectives.
- **Feedback and Revision** – The teacher acts as facilitator and coach to give direct feedback and guide students in reflection, self-assessment, and peer assessment.
- **Publicly Presented Project** – Presenting to an authentic audience gives students pride.

Dig Deeper

- 5 keys to rigorous PBL lessons (from edutopia): <http://www.edutopia.org/video/five-keys-rigorous-project-based-learning>
- A great blog on PBL <https://biancahewes.wordpress.com/2013/01/04/project-learning-aka-pbl-for-beginners-plsm13/>

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

Digital Citizenship

Digital Citizenship is commonly defined as **the norms of appropriate, responsible technology use**. A digital citizen is **one who knows what is right and wrong, exhibits intelligent technology behavior, and makes good choices when using technology**. Does that sound like you? Click on the infographic below – do you practice all of these nine skills on a regular basis?

Mark Ribble expanded these basic concepts into nine elements organized into three categories:

School Environment and Student Behavior

1. **Digital Rights and Responsibilities:** the privileges and freedoms extended to all digital technology users, and the behavioral expectations that come with them
2. **Digital Communication:** the electronic exchange of information
3. **Digital Access:** full electronic participation in society
4. **Digital Etiquette:** the standards of conduct expected by other digital technology users
5. **Digital Security:** the precautions that all technology users must take to guarantee their personal safety and the security of their network

Student Learning and Academic Performance

6. **Digital Literacy:** the capability to use digital technology and knowing when and how to use it
7. **Digital Law:** the legal rights and restrictions governing technology use

Student Life Outside the School Environment

8. **Digital Health and Wellness:** the elements of physical and psychological well-being related to digital technology use
9. **Digital Commerce:** the buying and selling of goods online

Many argue that these elements should just be subsumed into the general definition of “citizenship” due to the pervasiveness of technology in today’s society. Regardless of definitions, these concepts are firmly embedded in learning standards from Common Core to the ISTE Educational Technology Standards for both students (ISTE-S) and teachers (ISTE-T). What age is too early to begin talking with students about digital citizenship? Some K-12 schools are introducing personal digital responsibility as early as 1st grade.

Resources to Explore

The following groups of resources will be helpful to you as you grow in your own digital citizenship and as you influence the next generation of digital citizens.

Digital Rights and Responsibilities

<http://thebookfairygoddess.blogspot.co.nz/2012/09/digital-citizenship.html>

Cyberbullying Game from Digizen <http://www.digizen.org/resources/digizen-game.aspx>

Teachers are also victims of Cyberbullying! <http://jessysaurusrex.com/2014/04/22/teachers-cyberbullied-by-students-and-their-parents/>

Digital Access

Donors Choose <http://www.donorschoose.org/>

Bridging the Digital Divide with HomeLink <http://www.edutopia.org/homelink-free-student-computers-internet>

Digital Etiquette

Digital Passport (Share Jumper) <https://www.digitalpassport.org>

BrainPop Digital Etiquette <http://www.brainpop.com/technology/freemovies/digitaletiquette/>

Digital Security

Privacy and Security Scope and Sequence <https://www.commonsense.org/education>

Jessy Irwin's Slideshow about Info Security in the Classroom. pay particular attention to slides 8-14.

https://docs.google.com/presentation/d/1nLe2F3yoZpGcE8JY27UfgB5IObVJtIgdAbiXITEcT4k/edit?pli=1#slide=id.g5e0b20e58_063

Hector's World <http://hectorsworld.netsafe.org.nz/>

Carnegie Cyber Academy <http://www.carnegiecyberacademy.com/>

I Know What You Did Five Minutes Ago <http://www.youtube.com/watch?v=cYVBshcN7wU>

Digital Literacy

Digital Passport (Search: Search Shark) <https://www.digitalpassport.org>

Information Literacy Scope and Sequence <https://www.commonsense.org/education>

Your Digital Footprint May Be Unflattering http://www.youtube.com/watch?v=o8C1a2z_cuQ

Digital Law

Digital Passport (Creative Credit: Mix-n-Match) <https://www.digitalpassport.org>

Creative Credit and Copyright Scope and Sequence <https://www.commonsense.org/education>

Five-Minute Film Festival Copyright and Fair Use for Educators <http://www.edutopia.org/blog/film-festival->

Digital Health and Wellness

Self-image and Identity Scope and Sequence <https://www.common sense.org/education>

Digital Footprint & Reputation Scope and Sequence <https://www.common sense.org/education>

Digital Compass- educational game that gives kids the freedom to explore how decisions made in their digital lives can impact their relationships and future. <https://www.digitalcompass.org/>

Digital Passport-Teach the basics of online safety and responsibility to third- through fifth-graders with this suite of games. <https://www.digitalpassport.org>

Digital Bytes- teaches teens digital citizenship through student-directed, media-rich activities and collaborative projects that voice their ideas for making smart choices. <https://www.common sense.org/education>

Digital Commerce

Privacy, Identity, and Online Security <https://www.consumer.ftc.gov/topics/privacy-identity-online-security>

ISTE Standards

5. Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

- a. Advocate and practice safe, legal, and responsible use of information and technology
- b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
- c. Demonstrate personal responsibility for lifelong learning
- d. Exhibit leadership for digital citizenship

ISTE-T 4. Promote and Model Digital Citizenship and Responsibility

Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

- a. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources
- b. Address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources
- c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information
- d. Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools

This resource is no cost at <https://open.library.okstate.edu/applicationsofeducationaltechnology/>

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