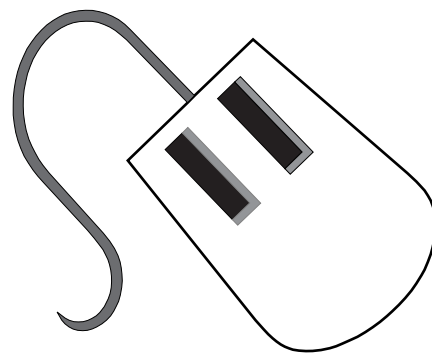


CHAPTER 9

Integrating Educational Technology: Best Practices



As a teacher planning to integrate technology into your curriculum many factors must be considered. Many of these factors are beyond the immediate control of the classroom teacher. These would include the number of computers, placement of computers, and the connectivity of those computers. Other factors, such as when to use computers, how to best teach the curriculum, and making resources available to students, are well within the grasp of the classroom teacher. This chapter will discuss some of the factors involved in planning for technology use. Along with this, examples of good tested units utilizing technology will be listed.

WHAT IS AVAILABLE?

In chapter 4 of this text we have shown that there really is no such thing as a “normal” classroom. There are many different factors that determine what a classroom will look like. Most schools today have Internet access, and of those schools, there are varying degrees to which technology is used. Based on this information, a college graduate can feel pretty confident that the Internet will be available to them as they take their first job.

If a school does have computers, there are various ways that they will be placed in the building. The three most common configurations that a teacher will see in the schools are single computer in the classroom, mini-lab in the classroom, or a computer lab. Each of these configurations has strengths and weaknesses, and a teacher must take this into account when they are planning.

A computer lab is a very popular model for getting technology in the hands of students. The computer lab is easier to maintain and connect to networks than a more diffuse implementation of computers. From a teacher perspective it allows every student to have a computer. This is beneficial when learning a piece of software or using a simulation. Despite these benefits, research has shown that computers are most effective when they are placed in the classroom.

The classroom mini-lab is the best situation for students using computers. This is because, in most cases, the single computer in a single computer classroom is utilized mostly by the teacher to do administrative tasks, research, and presentations (1999,



Shelly). This, though, does not have to be the case. Many software companies like Tom Snyder Productions (<http://www.tomsnyder.com/>) have created software specifically designed for class use in a single computer classroom. The power of the classroom mini-lab is the convenience. When a teacher finds a teachable moment in the classroom a computer is readily available for reference and extension activities (1999, Shelly).

SAMPLE LESSONS

What will be discussed here are some basic ideas on how to use technology in a specific subject. Please keep in mind that this is not an exhaustive list of all possibilities and you are encouraged to explore and experiment on your own to determine how best to use technology in your own classroom. These are just a few ideas that the author has read about and/or tried. Many of these examples come from web sites such as the Apple Learning Interchange (<http://www.ali.apple.com/>) and Lesson Plan Search (http://www.lessonplansearch.com/Technology_and_Media/) that have searchable databases of lesson plans utilizing technology. Lesson plans are also readily available on the web through search engines.

The target of these ideas is average to slightly below average schools. This means that the ideas are directed at those schools that have Internet access, but maybe not in the classroom, or have only one computer lab to share, etc. The rest of this chapter contains discuss many best practices for different computer scenarios.

Language Arts/English

The obvious use of technology in Language Arts is using a word processor to write papers. As students progress from kindergarten to twelfth grade, the emphasis on “typing a paper” goes from non-existent to required. Students can also use publishing software to do book reports, make newsletters, and even design posters as advertisements for books, etc. Technology can enhance each stage of the writing process (prewriting, writing, editing, revising, and publishing), which can lead to better writing across the board. Also, if students are writing comparison papers on authors, the Internet is a useful tool to research the author. The Internet can also be used to practice and enhance writing by having students send e-mails to experts to help gather research for a paper. Students can even write a commercial and then make the video and use software to edit it (more on this below).

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=20048

http://ali.apple.com/ali/uops_display.php?findunit=8877

http://ali.apple.com/ali/uops_display.php?findunit=20100

http://ali.apple.com/ali/uops_display.php?findunit=5774



Social Studies/History

Social studies probably lends itself best to integrating technology in the classroom given the massive number of resources available on the Internet related to social studies issues. Simple searches on the Internet can lead to resources that help in researching historical events, cultures, foods, people, places, famous battles, monuments, etc. This list goes on and on. Social studies are also an area with the most disinformation and misleading and biased information, so care should be taken to ensure that information discovered is located on credible websites. Much of the information that students stumble upon is biased. Always check the authority of the website (produced by a reputable institution, author, etc.).

PowerPoint is useful for livening up a lecture on a topic that might be considered boring by some students though technology cannot make a bad teacher good. Students also enjoy turning in projects like PowerPoint instead of writing a paper so you might spice up your lesson requirements by having students create a PowerPoint presentation instead of a paper every so often. Another idea is to make a video reenactment of something historical and edit it using editing software (iMovie, Final Cut Pro etc.). One of the neatest tools available to a teacher that helps to integrate the Internet and technology is called a WebQuest. You will learn more about WebQuests in another chapter, but WebQuests lend themselves to social studies quite well.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=20125

http://ali.apple.com/ali/uops_display.php?findunit=23016

http://ali.apple.com/ali/uops_display.php?findunit=8012

http://ali.apple.com/ali/uops_display.php?findunit=2569

Science

Technology can be very useful in many different disciplines regardless of the grade level. In younger grades, streaming videos over the Internet provide access to visuals that are not available elsewhere. Some companies (e.g., United Learning, www.unitedstreaming.com) even have videos that contain quizzes at the end of the stream in addition to Blackline masters for many topics to print off and use in the classroom. Typically, a Blackline master is a black and white colored document that acts as a reference sheet/handout on a particular topic. Numerous experiments could be done in a virtual sense if the content of that experiment is dangerous or too expensive to take part in (See <http://www.frogguts.com> for an example virtual experiment). Researching planets for astronomy class becomes infinitely easier with the broad resources of the Internet. Imagine going the Jet Propulsion Laboratory website to research what they have found with the Mars Explorers or visiting NASA's

picture of the day for class discussions (<http://antwrp.gsfc.nasa.gov/apod/astropix.html>). Students could even produce slide shows that demonstrate basic science principles as a review.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=20075

http://ali.apple.com/ali/uops_display.php?findunit=8882

http://ali.apple.com/ali/uops_display.php?findunit=7903

http://ali.apple.com/ali/uops_display.php?findunit=7939

Art

In an art class, a teacher could use the power of a computer to show slides of famous artwork instead of buying lithographs that are expensive and delicate. Virtual field trips to famous museums (the Louvre, Guggenheim, www.apple.com/quicktime) are a great way to use technology and never leave the confines of the room. Depending on the class curriculum, students could also be taught about using photography software (e.g., Adobe Photoshop) and produce professional quality prints. As students create artwork, the items created can be scanned into a computer and saved. These various samples can be pulled together to create a digital portfolio (see, for example, chapter on digital portfolios).

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=8837

http://ali.apple.com/ali/uops_display.php?findunit=8835

http://ali.apple.com/ali/uops_display.php?findunit=1229

http://ali.apple.com/ali/uops_display.php?findunit=1081

Physical Education

Due to the nature of PE, it may be difficult to use technology more than a few times per year. If health is part of the curriculum, many topics could use word processing and the Internet for research and paper writing. One could envision using PowerPoint to introduce a new sport of study, going over rules and basics. This would address the visual learner as well as the auditory ones. Students could also use a spreadsheet application to keep track of their heart rate during an exercise session, running times, or they could use the spreadsheet to track their repetitions in a weightlifting environment. Spreadsheets are a great tool for tracking all sorts of data in athletics and recreation. Many PE teachers also teach Health class(es) and many of the tips described for other disciplines can apply to the health sciences as well.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=2603

http://ali.apple.com/ali/uops_display.php?findunit=5905

http://ali.apple.com/ali/uops_display.php?findunit=57

Music/Band

The grade level will determine how much technology will be used in music classes. With the advent of MP3 files in today's world, legal copies of music can be incorporated into

the class (for listening and exposure purposes maybe) and music recorded in the classroom can easily be saved as an MP3 file. In high school and even college levels, Finale software could be used for composition purposes. Software is emerging that is bringing the cost way down for schools to create their own recording studios. For example, Garageband is a \$50 software application for the Macintosh that turns a computer into a recording studio stocked with hundreds of instruments and a recording engineer or two (available at <http://www.apple.com/ilife/garageband/>). Add a USB MIDI keyboard and you can create the sounds from hundreds of musical instruments using your keyboard and computer combination. This is great for a band instructor who wants to provide a demo to the horns section or a demo to the percussion section, etc.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=20065

http://ali.apple.com/ali/uops_display.php?findunit=1988

Foreign Languages

Numerous software titles exist to help in the teaching of foreign language. Teachers should take care to evaluate the software to ensure that it is beneficial for the class, in terms of both curriculum and cost. Websites also exist that can help in learning foreign languages. For example, one site (<http://www.uiowa.edu/~acadtech/phonetics/>) provides actual animations of the phonetic sounds used when learning a foreign language. Seeing and hearing an example of how the breathing works in relation to the sounds heard in a phoneme can help students to learn new sounds and words more quickly.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=7940

http://ali.apple.com/ali/uops_display.php?findunit=1532

http://ali.apple.com/ali/uops_display.php?findunit=922

Math

Like PE, math does not lend itself to easy incorporation of technology, at least in the ways it is integrated in other subjects. Math does allow for technology integration if teachers are creative and willing to try new ideas. Many upper level math classes now require some sort of graphing calculator. Many teachers also use an LCD screen on the overhead projector to show use of the technology. Spreadsheets can be very useful tools for learning how to use technology to help solve scenarios that replicate real life. For example, students might be asked to figure out the total cost of a new car when interest rates are factored in. Students might have to try and predict the annual fuel costs, etc. As younger students learn about new math concepts, a word processor or database could be used to keep track of the new concepts. Writing the concept down can help to reinforce the new concept.

Model sample units

http://ali.apple.com/ali/uops_display.php?findunit=6194

http://ali.apple.com/ali/uops_display.php?findunit=2648

http://ali.apple.com/ali/uops_display.php?findunit=2643

http://ali.apple.com/ali/uops_display.php?findunit=7943



SUMMARY

When planning for technology integration it is important for teachers to take many factors into account. It is easy to assume that computers and the Internet will be available, but the question of where they are available remains to address. In most cases, computers will either be in a lab or in the classroom. Classrooms usually have a teacher computer, but not all of them have mini-labs for student use.

Lesson plans and unit plans utilizing technology are readily available on the web from sources such as the Apple Learning Interchange and Lesson Plan Search. Lesson plans can also be obtained through web search engines.



DISCUSSION QUESTIONS

1. What factors need to be considered when planning to use computers with your students?
2. What is the best setup for a classroom; one computer, mini-lab, or 30-station lab? Discuss the merits of each, and possibly the implementation with regard to different subjects.
3. Explore a website where you can find lesson plans that incorporate technology. Discuss its ease of use and overall effectiveness.



WEBSITES

Apple Learning Interchange (ALI).

<http://www.ali.apple.com>

Apple Quicktime Movies

www.apple.com/quicktime

Frog Guts Virtual Dissections

<http://www.frogguts.com>

Lesson Plan Search

http://www.lessonplansearch.com/Technology_and_Media

NASA Pictures

<http://antwrp.gsfc.nasa.gov/apod/astropix.html>

Tom Snyder Productions

<http://www.tomsnyder.com/>

United Streaming Educational Video Feeds

<http://www.unitedstreaming.com>



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Apple Learning Interchange. Apple Computer. Information retrieved 5/20/04.

Shelly, G. & Others (2002). Integrating Technology in the Classroom. Boston, MA: Thomson Learning.

