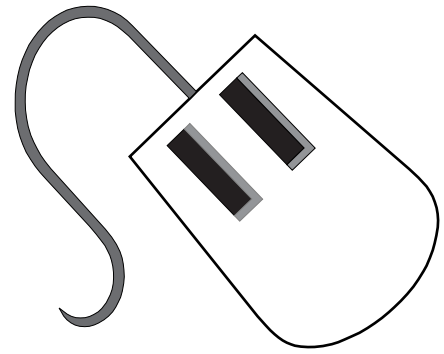


# CHAPTER 6

## Software

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### INTRODUCTION

A computer would be meaningless without software. Software is what brings the computer to life. Software is the name given to computer programs that are written to instruct the computer how to do something; a computer by itself does very little.

The main software that every computer uses is called the operating system. The operating system controls the computer and allows the user to perform actions such as opening various software programs (e.g., MS Word) and helping the computer communicate with hardware attached to the computer (e.g., printers, scanners, monitors). This chapter has a focus on application software, but Appendix A can provide you with more information about operating systems.

The software discussed in this chapter can be found in a typical school setting. Productivity software will be discussed first and is followed by educational software.

### PRODUCTIVITY SOFTWARE

You may have heard of the phrase ‘productivity software’ previously. This is because productivity software includes some of the most common office-type applications. Productivity software is designed to support people, including teachers and students, as they work to be more productive. Some of the main productivity applications include word processing software, spreadsheet software, presentation software, and database software.

#### ***Word Processing Software***

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The most widely used software application is the word processor. Word processing software is used to work primarily with text to create documents (e.g., letters, reports, newsletters). The most commonly used word processor is called Microsoft Word, but many other titles exist (e.g., AppleWorks, Wordperfect, Microsoft Works). Figure A shows one part of a page of text in a word processor.

Teachers can use a word processor to create many documents for the classroom. Teachers may use a word processor to write lesson plans, create worksheets develop tests. The possibilities are many. In fact, many documents the average person encounters each

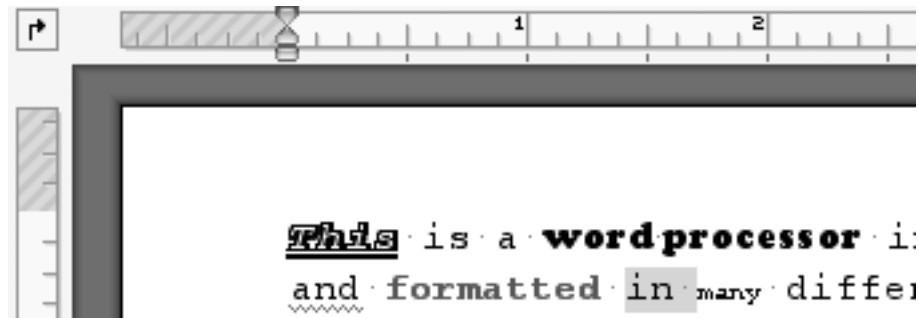


Figure A Word Processor in Action

day can be created using word processing software. This does not mean that word processors are ideal for all documents, but word processors can do most of what the average classroom teacher will need.

Word processing software is often used for desktop publishing. Desktop publishing is the use of software to create documents that are to be shared. The difference between word processing software and desktop publishing software is that the final results of desktop publishing software tend to look more polished and professional. Some people use an application like Microsoft Word to do their desktop publishing (e.g., newsletters for parents), but other teachers use a higher-end application that is specifically designed for desktop publishing but is more difficult to learn than a word processor. The most common desktop publishing application is Microsoft Publisher, but other titles include Adobe InDesign and QuarkXPress.

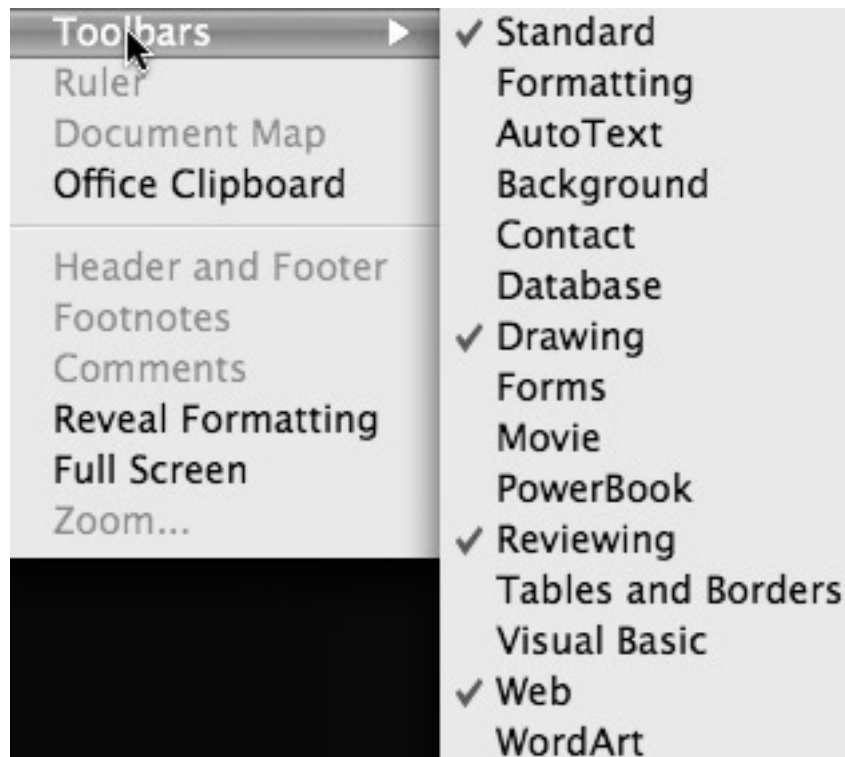
One of the great benefits of word processing software is that students can use it to improve many aspects of their writing across the curriculum. A word processor has many benefits over the handwritten page, but the biggest benefit that many teachers will realize is that handwriting issues disappear when the student uses a word processor. Some students who have learning disabilities may have difficulty and spend much energy trying to manipulate a pen or pencil to create letters. The word processor can benefit the student by removing the barriers to writing, thus allowing the student to focus on the content of the paper.

The writing process is typically considered to be a 5-step process:

- 1) prewriting (e.g., brainstorming),
- 2) writing,
- 3) revising (e.g., reading through your paper and deciding how to improve the writing),
- 4) editing (e.g., checking for spelling, grammar, punctuation, word usage), and
- 5) publishing (e.g., printing the document, saving to the Web).

Research indicates that student writing does improve when using a word processor over using a pen and paper. Further, each step of the writing process is easier using a word processor, but the editing and revising stages are particularly more efficient. As a teacher, you can help your students use the writing process in any curricular area when using word processors. You will likely find much better written product from your students if you do.

A student should understand the basics of operating a computer to find success using a word processor (e.g., using a mouse, opening and saving files), and a user can benefit greatly by learning what the various keys can do (e.g., space bar, return, delete, arrow



**Figure B** Toolbars in a Word Processor

keys). As their hands get larger, students should learn how to type. When typing becomes more natural, students are able to focus less on the process of finding the correct keys and more on the process of writing, which should be the goal while using word processors. Young students should learn how to type text, how to format the text, and how to edit text. Elementary school students can also learn how to use the various pull down menus (e.g., File, Edit, View, Insert, etc.) and they can learn how to use the help features built into most word processing software. As the students get more proficient at using word processing software they can be introduced to more advanced options.

One way to extend the capabilities of many word processing software applications is to use features already built into the software. For example, Microsoft Word has many toolbars available in the View menu that can be turned on to add to the functionality of the word processor (see Figure B).

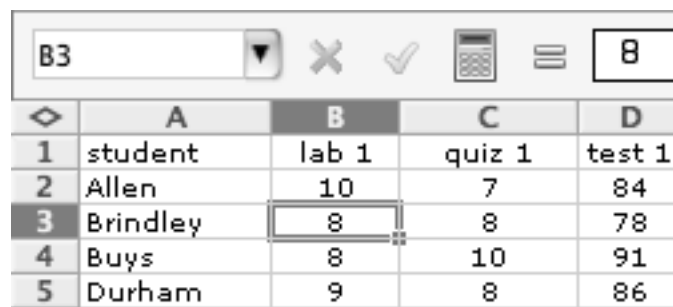
## ***Spreadsheet Software***

The first spreadsheet, called VisiCalc, was developed in the late 1970s. VisiCalc quickly turned personal computers from machines doing computer-related functions to machines that could revolutionize the business world. VisiCalc (short for Visual Calculator) did the same basic function back in the 1970s that many people use spreadsheets for today: organize and manipulate numbers. Spreadsheets have matured from the days of revolutionizing the business world and Microsoft Excel has become the most widely used spreadsheet.

Most interfaces for spreadsheet applications look very similar despite the actual software package being used. Most spreadsheets look like a bunch of boxes or a grid that fill much of the screen (see Figure C). These boxes are called cells. The cells stretching from

left to right in a line across the screen are the rows and the cells from top to bottom are the columns. Each individual cell has a unique address. For example, the selected cell in Figure C is labeled as B3. The columns are named according to the alphabet (A, B, C . . . AA, AB . . . ) and the rows are labeled with numbers and start with 1. And, unlike the early spreadsheets, the software now allows the user to place many other variables beyond numbers in a cell (e.g., text, formulas, dates and times, and more).

Teachers are discovering many strategies for using a spreadsheet in how they manage the classroom. Most teachers who rely on using a paper grade book will quickly see the benefits of using a spreadsheet on the computer over the paper and pen version. A spreadsheet can be used to easily figure student grades and class averages, etc. The teacher can quickly create charts that give the data a visual display (e.g., pie chart, bar chart) for analysis (see Figure D).



	A	B	C	D
1	student	lab 1	quiz 1	test 1
2	Allen	10	7	84
3	Brindley	8	8	78
4	Buys	8	10	91
5	Durham	9	8	86

Figure C Spreadsheet Interface

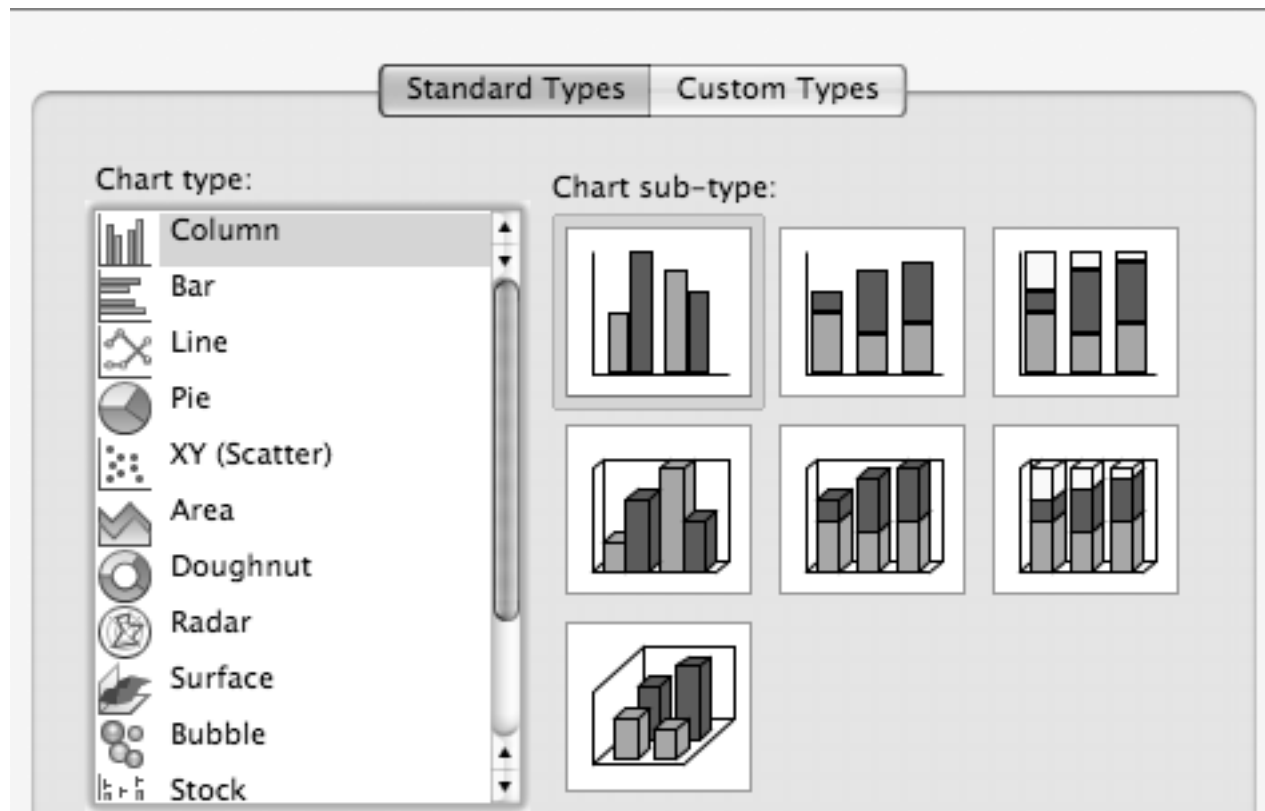


Figure D Selecting a Chart Type in Spreadsheet

Spreadsheet software can be used in a variety of ways in all kinds of classrooms. In early elementary classes, the emphasis can be much less on the numbers and much more on text. For example, Figure E shows a spreadsheet comparing two countries with individual cells being used to display and organize the results.

Teachers could also create a weekly spreadsheet that displays the homework for each student to take home to parents. Figure F provides one example of how this might look.

	A	B	C
1	Compare what	Canada	United States
2	location	North America	North America
3	official languages	English and French	None (English)
4	population	30 million	285 million

Figure E Spreadsheet for Comparing

	A	B	C
1	HOMEWORK ASSIGNED		
2	Sept. 5 - 9		
3	Monday	Tuesday	Wednesday
4	Reading	Reading	Reading
5	Read for 1/2 hour - Red Series Collection. Write short summary for each book	Continue reading	Read Textbook: p 84
6	Math	Math	Math
7	Page 59 - Complete even problem set	Page 65 - Complete even problem set	Page 68 - Complete even problem set
8	Spelling	Spelling	Spelling
9	Write spelling words # 1-5 in a sentence.	Practice words #1 - 5 for quiz tomorrow	
10	SPELLING LIST # 4		
11	1. October		
12	2. autumn		
13	3. Halloween		
14	4. ghost		
15	5. pumpkin		
16			
17			
18	Child's Name		
19			
20	Parent Signature:		

Figure F Spreadsheet Organizing Homework

A teacher could use a spreadsheet with students to track daily temperatures or to help keep the accounting for a school or classroom business. A math teacher could use a spreadsheet to have students do “what if” scenarios. For example, students could use a spreadsheet to compare total purchase price of a new car depending on years of the loan and various interesting rates.

As students get more advanced, they can learn about using formulas in a spreadsheet (e.g., Average, Sum, Standard Deviation). Formulas can help students to do complex calculations very quickly and effortlessly. A spreadsheet could be set up to use a formula to calculate what a student’s weight would be on the moon or on another planet. A Physical Education teacher could use a function in a spreadsheet to compare daily calories taken in and weight gain/loss and how the two are positively related.

Some people who are not proficient with math may find a spreadsheet to be a bit intimidating, but spreadsheets have so many uses that can go beyond manipulating numbers. Any teacher should be able to find ways to supplement a curriculum using spreadsheet software.

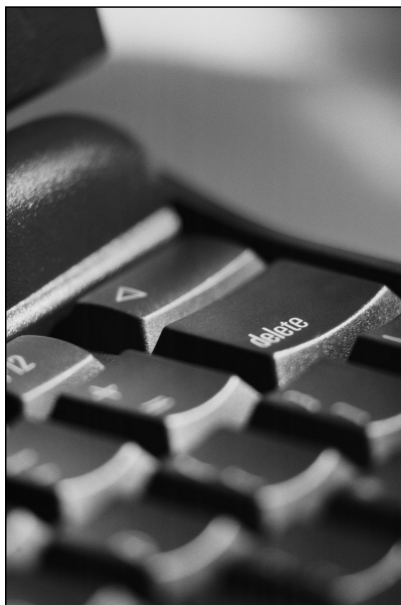
## ***Other Productivity Software***

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While word processing software and spreadsheet software tend to get used more than other productivity applications by teachers and in schools, there are still other productivity applications, including: presentation software and database software.

**Presentation software** allows teachers to use a computer and projector in a similar manner as using transparency sheets with an overhead projector, but presentation software is much more feature laden. Two examples of presentation software application are Microsoft’s PowerPoint and Apple’s Keynote. Figure G provides a glimpse at Apple’s Keynote application and a presentation being edited.

Microsoft’s PowerPoint is a full-fledged presentation application, but it has also become a rudimentary multimedia development tool. Teachers can create slides for presentations, but teachers can also use PowerPoint to create student applications that are interactive. Presentations can offer multimedia elements (e.g., audio clips, video clips, photographs, charts) that a normal paper worksheet or textbook cannot. A benefit to using presentation software in the classroom is that a teacher can provide the presentation file to students and this can remove the need to take notes, which means students are freed from the task of writing allowing them to better pay attention to the content being discussed in class. This is an accommodation that can benefit many students.



Students can also use presentation software many different ways. Some teachers will have students create a presentation rather than writing a paper, which can benefit students who have strengths other than writing. Students can create slides full of text, images, and other media that can far exceed what a normal word-processed document can provide in regard to multimedia. The limitation of presentation software is that each page or slide that gets displayed is limited in size. The result is that many slides are limited in the depth of information students provide, though they are not limited in the number of slides developed.

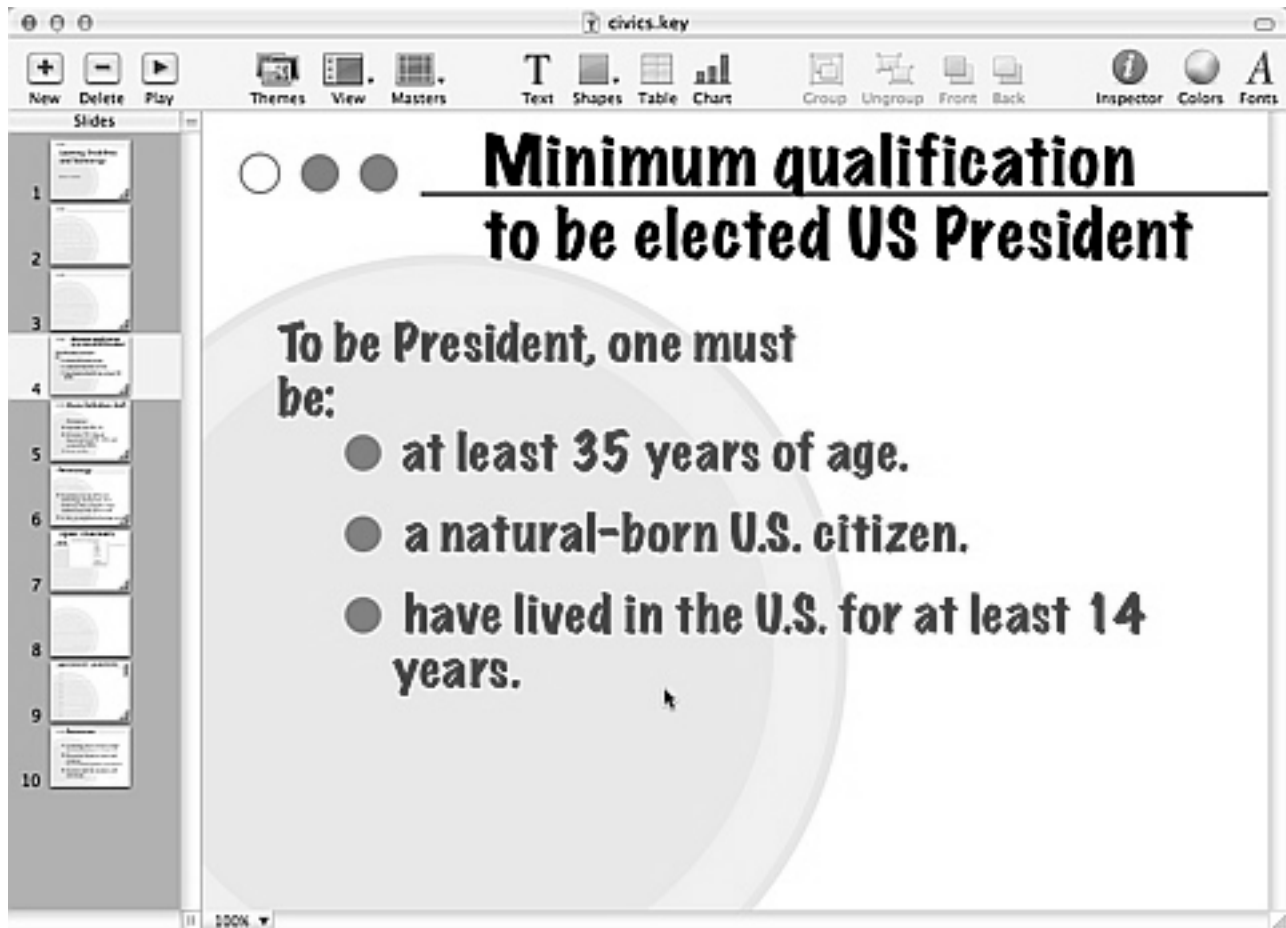


Figure G Presentation Software in Action

Another less commonly used productivity application is **database software**. This software is used to store and organize information. The database application provides a tool for users to manipulate data and information and output into reports. A teacher might use a database to store information about each student including name, address, parents/guardians, etc. Another database could be created to store lesson plans. A teacher could use key words to identify a specific lesson plan (e.g., frogs, dissecting, biology) when storing and retrieving the data. Most school libraries use a computer database to store card catalog data and that database allows users to search using various search criteria (e.g., author's last name, date of publication, title, call number). All students should understand how to use a database. In fact, the Internet is actually the largest database on Earth.

Most teachers will never design their own database; however, many teachers might use a spreadsheet to solve problems that might be better suited for a database. A database differs from a spreadsheet in that the database is typically harder to set up and it has a larger learning curve to get started. The database can be easier to manage once it is created and can be easier to share information and reports, etc. The spreadsheet is most often thought of as a tool to manipulate data—specifically numerical data, but a spreadsheet can handle other variables as well, which is why many people will choose a spreadsheet for functions that a database is designed to do. While a spreadsheet is used and updated by one user at a time, a database can be configured to be used by many users at a given time and can have various levels of security implemented. The bottom line is that most

people will choose a tool they are comfortable with over a tool that is unknown and few teachers know how to plan and design a database.

There are many other productivity-type applications that serve a number of purposes. For example, some software gives users the ability to create flowchart diagrams and outlines very easily (e.g., Inspiration, OmniOutliner and OmniGraffle). Teachers and students can use the software to brainstorm, plan, organize, outline, and diagram a paper being written or another school-related concept. Many possibilities exist for software such as this that has so many different potential applications related to productivity and to the curriculum.

## EDUCATIONAL SOFTWARE

Educational software is a broad category that encompasses many different software titles. This category includes software designed for teachers and software that is created to be used by students. Both of these categories are examined in this section and both teachers and students use many of the software titles discussed.

### ***Educational Software for Teachers***

Classroom management software is gaining much popularity in the classroom. This is software that is created to help a teacher run the classroom more efficiently. For example, many schools are now collecting attendance on the computer. Your future classroom might have software for you to use that makes the attendance process more efficient. You might also have a website that you visit to enter the daily attendance results. Using technology helps to provide feedback to parents more quickly when problems with attendance arise.

A teacher might also use software to manage the grades of the students in a class. In the past, most teachers used grade books with graphed paper, but grade books are rapidly being replaced in many schools with electronic solutions. Some teachers will use a spreadsheet to keep grades organized. Some schools will provide grade recording software or a website where teachers can enter and store grades (see Figure H). The nice thing about

ers by: <u>Last Name</u> <u>First Name</u>	<u>Score</u>
<b>Web Project (50 pts)</b>	
Anderson, Kari	45
Baker, Ron	41
Bulter, Desiree	48
Cooper, Carlos	36
Edwards, Elizabeth	

Figure H A Web-Based Grade Book



## Cases

Mrs. Wei received two new computers for her classroom to start the school year. They came with a suite of productivity applications, which she greatly appreciates; however, she would also like some applications that can help her meet some of her curricular objectives for 3rd grade. Some of her students are still struggling to learn how to read at grade level and her district is convinced that these reading skills are key to just about every subject in school and the State assessments will require the ability to read and comprehend questions. Mrs. Wei was not sure where to find software that she could trust as there are hundreds of titles to choose from. Another teacher suggested going to a site on the Internet that provides reviews of educational software. She found the following site using a search in Google:

<http://www.educational-software-directory.net/reviews.html>

This site had a listing of many software review sites on the Internet. Mrs. Wei decided to use a few of the sites listed because she did not want to trust just one site. One site she really liked allowed users to rate software so that she could see what other teachers thought of software. This site was: [http://www.epinions.com/Reference\\_Education](http://www.epinions.com/Reference_Education)

She wanted software that was written at about a first grade reading level. She found one title that was rated as very good (The Learning Company Reader Rabbit 1st Grade) and she found various vendors selling the software so she could compare prices.

Mrs. Wei also received a long list of potential software resources (e.g., categories and specific names of software) for future use from the International Society for Technology in Education (ISTE), which is the preeminent professional organization for teachers and technology:

[http://cnets.iste.org/teachers/t\\_software.html](http://cnets.iste.org/teachers/t_software.html)

entering grades electronically is that parents can receive feedback much more effectively than they could prior to these current technologies being available. Many systems allow parents to check attendance and grades as needed, which can help to get parents more involved in the educational process.

## ***Academic Software***

Much education software exists on the market. And, while trying to sift through individual software titles can be cumbersome and tedious, knowing how you want to use the software before shopping can reduce your time tremendously. Software can be classified in many different ways, but most educators tend to recognize the following categories of academic software: Drill-and-practice, Tutorials, Learning Games, Simulations, Integrated Learning Systems, Reference, and Other Academic Software.

**Drill-and-Practice Software** was very popular in the early days of computing. This software is developed to reinforce and practice content that is not being introduced for the first time. In other words, drill-and-practice can work very much like traditional flashcards in helping to practice already introduced content (e.g., the multiplication tables). This type of software tends to be passive in nature, so care should be taken to ensure that students using drill-and-practice software are being stimulated and are getting good practice

on a targeted concept. Newer drill-and-practice software can take advantage of multimedia elements to provide a more feature-rich learning experience. One of the great educational benefits of technology is the ability to receive instantaneous feedback. The most effective drill-and-practice software will provide instant feedback to the learner.

Unlike drill-and-practice software, **tutorial software** also present new material. Tutorial software is designed to carefully introduce a new concept and walk the user through the various steps towards learning the new concept or skill. Some tutorial-based software will take the user through predetermined steps in order and other tutorial software leaves the order of the information being presented to the user. Tutorials are interactive in nature, which means that the student gets to play a significant role in using the software and will be able to make decisions and demonstrate an understanding of the content being presented. Many effective tutorials will let the user determine the pace of the learning.

**Learning Games** present instruction in the form of a game. This means that the game will likely have the appearance of a video game, but there are still more archaic titles floating around. The benefit of this type of software is that it is usually more motivational to the learners as they are covertly, at times, presented with drill-and-practice or tutorial-type components. While the student may enjoy this software more than other categories, there are many critics to using games in the classroom. One of the main arguments is that the games can sometimes become more important and bigger than the learning. Care

should be taken when using educational games to ensure that winning does not become the objective over the curricular objectives.



Software that provides the user with an electronic version of a real life concept or experience is called **simulation software**. One of the most common types of simulators is a flight simulator, which allows the user to have an experience similar to flying a real plane without the dangers and logistical issues that come from the real thing. The software attempts to replicate the real flight as much as possible

and to create scenarios that might be experienced in a real situation. The user has to react to climate changes, air pressures, winds, altitudes, speeds, etc. The user is able to press keys on the keyboard and mouse (or a more advanced device, like a joystick) to control the functions of flight. There are many educational simulations appearing on the market and the costs vary greatly. An educational simulation might allow students to do virtual experiments in science, which can save money on supplies and can cut the dangers associated with working with many chemicals. For schools on a limited budget, dissecting a virtual frog can save money over purchasing real frogs and dissecting equipment. Simulation software also has applications in other curricular areas. Simulation software allows students to do more discovery-type activities in the classroom, but the software can also have tutorial components built-in to help free the teacher to work with specific students.

**Integrated Learning Systems (ILS)** include software that runs on a network of computers and is designed to provide instructional content, assessment, and a management system for substantial course content. An ILS might be used over many grade levels and can provide detailed information to teachers about specific curricular objectives. Integrated learning systems were much more popular in the earlier days of computing in schools. Much research has shown that ILS provided skills in isolation of the curriculum and any “learning” is not being transferred to other subjects and tasks. A problem with ILS is that these systems tend to rely on frequent practice and rote instruction and memorization. One of the larger criticisms is that the ILS was not only changing the curriculum, but it was also becoming the curriculum and the teacher. A much more effective way to use an ILS is as a supplement or remediation for students who may not have grasped material when taught the first time by the teacher. A good teacher is still far more effective than any computer software at instruction, which is why the ILS system might work well for some students who need remedial-type activities.

**Reference software** is really a broad category by itself. Reference software is that software designed to provide the content typically found in reference books—dictionaries, encyclopedias, etc. The benefit of presenting this material in an electronic format is that a classroom or teacher can save much space using technology (e.g., a few CD-ROMs versus a whole encyclopedia set sitting on the shelves). The bigger benefit to reference-based software is the multimedia element that software can add to a traditionally paper-based medium. Rather than showing your students the text and a photo from the “I have a dream speech,” software can now be used to actually watch the speech on video.

**Other academic software** makes up the largest collection of educational software. This software includes curriculum-related products. Educational software is used most often to supplement the curriculum being taught, but will occasionally be used in place of the curriculum if the software can meet specific objectives as determined by the classroom teacher. Buying or selecting educational software should be taken with care and this is addressed in more detail in Chapter 9.

Much educational software appears in the form of subject area software. This is software with a specific objective of helping to reinforce a subject taught in school. For example, one software title is, “Reading for Meaning” and another is called, “Math Mysteries.” The difficulty with subject area software is often trying to determine whether the software will benefit your students in a specific content or subject area. As a teacher, you should try and determine whether software has been tested on students similar to the students in your school and what those results were. Too often, software is given some features that make it look appealing to teachers or to students (e.g., fancy packaging, nifty name, animations) with less care taken with regard to the actual content of the software. Some websites provide free reviews of educational software and can be found with a simple web search. Thousands of titles exist and fortunately, there are strategies for narrowing a search for a specific software package.



## SUMMARY

Productivity software remains the most widely used software in education with word processing software at the top of the list. This is not a surprise because word processors can be used in so many different subject areas.

Other productivity software include spreadsheet software, presentation software, and database software. Many of these categories of software are found with regularity in our classrooms. Productivity software covers a wide variety of types of software, but the main function of this software is to help people be more productive and that typically results in more office-type work.

Educational software can come in the form of software designed for teachers (e.g., grade book software, attendance software) and software designed to be used by students—called academic software.

Academic software falls into seven categories as follows: Drill-and-Practice, Tutorials, Learning Games, Simulations, Integrated Learning Systems, Reference, and Other Academic Software. Each category of software has benefit and disadvantages, but this largely depends on the age of the students and the content area being studied. Knowing how a category can best be used will help to ensure that academic software is being used most appropriately.

When choosing software for your classroom, you should always consider the many needs and learning styles of your students. There is no software package that can replace you and there is no software solution that will work effectively with every student. A good teacher is still very much the key ingredient to good instruction and classroom management.



## DISCUSSION QUESTIONS

1. What productivity applications have you used and how have they saved you time?
2. Do word processors become too much of a crutch for student when learning to write?
3. In what scenarios would a teacher choose to use a database application instead of a spreadsheet?
4. When are drill-and-practice software applications beneficial to students? How can they be a hindrance to the learning process?

5. How are grade book software packages and a spreadsheet alike?
6. Should teachers take curricular time to teach software applications in schools given the drastic changes that occur often in the technology market?



## KEY TERMS

**Productivity software:** This is common office-type software designed to support people as they work.

**Drill-and-practice software:** This is software that reinforces and practices content that is not being introduced for the first time in a stimulus-response approach to learning.

**Tutorial software:** This is software designed to carefully introduce a new concept and walk the user through the various steps towards learning the new concept or skill.

**Learning games:** This is software that presents instruction in the form of a game.

**Simulation software:** This is software that provides the user with an electronic version of a real life concept or experience.

**Integrated learning systems:** This is software designed to provide instructional content, assessment, and a management system for substantial course content.

**Reference software:** This is software designed to provide the content typically found in reference books—dictionaries, encyclopedias, etc.



## EXTENSION

Create a sample grade book in a spreadsheet application and fill in some sample students. Try and use the spreadsheet to automatically figure your grades? Can you also create a bar graph chart that illustrates your results?

1. Search for websites that sell software at education prices? Do many of the titles have nice discounts for educators? What are the requirements to be able to purchase this software?
2. Explore the mail merge option in your word processing application. Read about how it works in the tutorial and then try creating a letter to a few sample parents. This is an example of combining a word processor and a database to create a short-cut in writing letters home to parents. One letter and one database can be combined so that you only have to write the letter 1 time and the software packages handle the bulk of the work for you.



## WEBSITES

### *Productivity Software*

The National Educational Technology Standards for Teachers Curriculum and Content Area Standards. This site discusses technology productivity tools.

<http://cnets.iste.org/currstands/cstands-netss.html>

### *Educational Software*

The National Educational Technology Standards for Teachers' Sample Software and Web Site Evaluation Forms.

[http://cnets.iste.org/teachers/web/t\\_form\\_software-eval.html](http://cnets.iste.org/teachers/web/t_form_software-eval.html)

Superkids.com is a site that provides user reviews of educational software.

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

