Tools to Higher Thinking

According to Grabe & Grabe (2004), computer tools consist of the applications and programs that are accessible through a computer for general and broad tasks. Grabe & Grabe emphasize that hardware and software are not the primary elements in a specific instruction, but instead are useful tools for a variety of tasks, topic areas, and curricula. This viewpoint contrasts with the attitude that software and hardware serve the function and fulfill the role of teaching and supplanting traditional instruction in a particular subject. Computer tools do not just serve the function of expanding and enriching a skill, but also in aiding students to achieve a higher order of learning in any subject area through the construction of thoughts, the generation of ideas, and the inherent discovery of appropriate application and treatment. Notwithstanding, computer tools can be used inappropriately by substituting traditional knowledge and skill acquisition with computer generated problem-solving, leading to excessive overdependence and under qualification in crucial necessary competencies.

The idea that students should actively participate in their own learning is one that Grabe & Grabe firmly defend. Through the tools approach, students are able to perform tasks related to a learning objective by means of a variety of software and hardware. Students apply the technology to fit their purpose; the soft or hardware does not establish the purpose. The resourcefulness of the teacher, who guides, facilitates, models, and structures the application and utilization of computer tools for a particular intention encourages promotes that the student gain and achieve meaningful, significant, applicable, and idiosyncratic learning.

Grabe & Grabe’s viewpoint that technology facilitates active learning led me to think again of Richard Clark’s “media are mere vehicles” theory. Grabe & Grabe recognize that computers are resourceful tools and provide a rich array of useful applications, yet acknowledge that it is not the computer, the hardware, nor a particular program or software that determines effective learning. The media employed can contribute to effective learning but is contingent upon the instructor, the delivery strategy, the content, the active participation, and discovery learning of the student. Grabe & Grabe term computer tools as mindtools, technology is a tool that serves as “an intellectual partner” to the learner (p. 85).

One type of computer tool is word processing. This tool enables the student to introduce and manipulate text and graphics. Through word processing, the job of typing a paper converts a monotonous and tedious recursive task into a more practical and efficient one. Drafting an essay should be recursive in that while creating text, the work does not progress linearly but rather continually shifts in attention from drafting and revising a work through writing, reading, re-revising, rewriting, rereading, and re-revising throughout. The word processor has made this process easier for the writer. No longer do students need to consider the limits of a line or a margin. With the computer’s word wrap feature, this inconvenience has greatly reduced. Through the process of using a word processing program, repetitive tasks are diminished, and the time expended writing, proofreading, and rewriting a paper is used more constructively.

However, word processing has its drawbacks as well. As a teacher of composition, I have noticed that students overlook the planning stage of writing. Students draft their work using a word processor without first preparing a general outline to structure their work. Their drafts are
aesthetically uniform and properly formatted, but totally disorganized. Prior to word processing software, strategy, thought, and organization were probably more seriously considered and enforced than they are today. Because of this, I require that students supply a general outline of their work along with their drafts. Preparing an outline forces students to organize their thoughts and justify the methodology used in a writing task.

ESL students oftentimes literally translate their thoughts and words from Spanish directly to English. This can cause text to be confusing, rambling, run-on, and incoherent. Spanish sentences and paragraphs are typically extended and expansive. The grammar check can be useful to these students but does not correct their writing problem. I urge students to think in English when writing in English instead of translating their thoughts and depending on the grammar check to correct their mistakes. I also remind students that sentences and paragraphs in English should be more concise and less embellished than Spanish.

The spell check, grammar check, and thesaurus are worthy tools in word processing but can also be problematic. With the spell check of a word processor, words such as there, their, and they’re; too, to, and two; though, thought, thou, through and thru are typically mistaken or “corrected.” Students assume that the word processor knows and fixes all, when in reality, it does not. I urge students to examine the response from the program, check their physical dictionaries, and critically determine the correct word usage in spite of the word processor’s response. Because of the word processor’s ability to spew out instant responses, students may not dedicate sufficient time and thought in developing their work and the writing process.

The thesaurus, although very beneficial, can also inconvenience a student. Because of their limited vocabulary in English, students assume that the word processor’s thesaurus will add more diversity to their papers. Many times, students write a word, ask the thesaurus for a synonym, and replace the original word with one that is not relevant to the idea the wish to convey. The instructor must advise students that although the thesaurus is a useful word processing tool, students should use words that they can define and defend.

Another computer tool illustrated by Grabe & Grabe is the spreadsheet. It is comparable to a ledger in that it is comprised of rows and columns that form cells at their junctures. The spreadsheet serves as a tool for calculating quantitative data and applying formulas specific to individual and collective cells. This tool facilitates the compilation of data in any topic area, performs multiple jobs that are commanded by the user, and provides verifiable conclusions. Prior to the spreadsheet, individuals would have to manually write out their formulas, determine the results through painstaking mathematical calculations, check their work, recheck the work, and once certain that the work was error-free, present their conclusions. Again, the efficiency, creativity, and constructiveness of the program are created by the user, not by the tool itself.

Although the spreadsheet is a valuable resource, students cannot depend on the spreadsheet to respond to all their mathematical queries. A student must be able to know how to develop, calculate, and solve a formula or equation by hand, and not rely on just the software for the solution. The methodology used to resolve a mathematical problem should be based on a student’s knowledge base, not the software’s.
Grabe & Grabe also mention the database as a computer tool. Databases are application programs that permit data to be developed, collected, stored, organized, and retrieved to fashion the objectives of a task. They consist of specific fields which contain categorized information. Databases are compiled for a vast array of topics and can be manipulated to serve specific goals in an assignment. They are useful tools in any subject area, and can be developed based on the objective sought.

Data collection devices are also classified as computer tools. These devices link to a computer after collecting some type of data for a subject. These devices consist of sensors that perceive signals from the environment and provide the information to interfaces that carry out a specific task related to the data collected on the sensor. When a sensor can be disconnected from its interface, it is termed a probe. Sensors link to computers or calculators in order to download information. A sensor that does not depend on another device for entering its data is known as a “data logger” (Grabe & Grabe, 2004, p. 113).

Web authoring software is also a computer tool. The process of creating a Web page not only requires technical skill but also aesthetic regard, language proficiency, organizational expertise, information synthesis, and strategic planning. The particular software does not instruct, the exploration, manipulation, and application of the software does.

The tools approach in computer application permits tasks to be carried out effectively, efficiently, and accurately. Because participants take active roles in finding resources, collecting and manipulating data, discovering solutions, drawing conclusions, and summarizing their work, they are more engaged in the task, perform more mental activity, and develop more sophisticated learning skills. Calculations with correct formula commands do not need to be worked out progressively but are determined instantly and precisely.

Because tasks performed through computer tools are efficient, functional, productive and accurate, technology serves a fundamental and essential role in facilitating learning. The acquisition of skills through the influence of general-purpose software and hardware is classified as the tools approach to learning where various topics and tasks are achieved. Students learn through discovery; multi-disciplinary objectives are accomplished; and collaboration is enhanced with the teacher’s assistance.

Computer tools are by all means beneficial, efficient, effective, and prompt. Educational computing allows persons to accomplish tasks with a greater amount of ease. However, persons should not be totally dependent upon the tools. In order to appreciate and exploit them productively, students must be skilled in the means of accomplishing the same task when these tools are absent. Developers, instructors, and students should not assume that these tools will replace the traditional knowledge needed for acquiring a skill, but rather the process time it takes to perform a task traditionally. Whether it is creating rhetoric, performing mathematical formulas, collecting and managing data, or developing and authoring a Web creation, students must first be able to dominate the traditional means of achieving the skill before depending on the “mindtools”.
References