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TEACHING *for* TOMORROW

Teaching Content and Problem-Solving Skills

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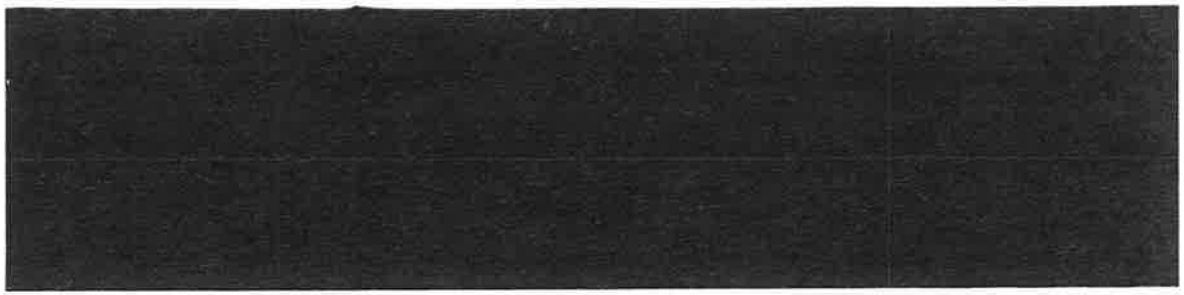

I have observed that something wonderful happens when you give young people a real-world problem to solve. It's like dumping out the pieces of a jigsaw puzzle on a table; the unfinished nature of the puzzle appeals to the mind to figure out a solution. Problems engage the mind, teasing and tempting the brain to find a solution. Giving students a problem to solve presents them with an unfinished picture that begs to be completed and that draws them into the task.

To challenge my students to see problem solving as detective work, I use role playing extensively in my classes as a way to present new tasks. There are several benefits to this approach. First, by taking on the role of a person from the business world or local community, students begin to get the perspective of people from outside the school system. Although my experience in business has certainly helped me create realistic scenarios for my classes, I don't have the necessary expertise to make a convincing role play for all of the problems I want students to solve. I have discovered a great resource for creating realistic role plays lies in parents and former students who are service advisors, engineers, computer salespeople, restaurant managers, and so on. When I invite them to the classroom, they bring different perspectives to problems and add genuine touches of realism that I couldn't provide on my own. Role playing provides a great way to make a real-world link to classroom tasks.

A second benefit of the role-play approach is that when I am in a role play, students do not have access to my expertise as a teacher. For example, if I am acting as the owner of a local auto parts business in need of a computer network, the students cannot ask me anything about how to design a network because, in the role of auto parts store owner, I know a lot about car parts but not very much about computers. Because they must think their way through solving this problem on their own without access to my knowledge on the topic, students begin to develop independent thinking skills.

Indeed, when the teacher takes on a real-life position from outside the classroom to present a task, students naturally shift into real-world roles for themselves when they solve the problem. For example, let's say a teacher walks into the classroom and introduces herself as the manager of a biomedical laboratory. The lab is having a problem with bacterial outbreaks occurring when certain tests are done on urine, and she says she needs the students to find a way to stop the bacteria from growing. Instinctively, the students take on the role of laboratory consultants as they apply their knowledge of biology and chemistry to solve this problem. Not only are the students covering the material in the curriculum guide, this real-life simulation gives them practice at doing various kinds of jobs.

One of the things I enjoy most about using the real-world simulation approach is observing the response I get from students when they are given their first task in this manner. They are nonplussed! Here is how I begin the year with my senior technology classes.

> After I address all the "administrivia" associated with school start-up, I stand up and say to my class,
>
> "Good morning, my name is Mr. Henderson, and I own a local commercial painting business. The reason I asked to meet with you this morning is that I need a Web site for my business that will promote our company to prospective clients. We would

like the site to start with an animated introduction page. We want the menu of options to stay on the screen at all times, and we would like a rotating logo in the upper-left corner, if possible. Do you have any questions?"

Students usually just stare at me in silence. Then I sit down.

It is important to note that I do this before I have taught them any of the skills necessary to do this task. How do you suppose the students respond after I sit down? Amazingly, after a few more moments of silence, they begin to talk to each other about their summer, their plans for after school, and various other items of interest to 16- and 17-year-olds. They are waiting for me to tell them what to do. So, after a few minutes have passed, I stand up and say,

"I forgot to mention that this Web site project for Mr. Henderson is worth one hundred marks and it is due in one week."

Now what do you imagine the response is from the students? It ranges from incredulity to outright rage.

"You can't expect us to do this in one week—we don't know how to create Web animations or rotating logos!" someone will say.

"That is a statement. I don't know how to respond to that," I reply.

"Well, aren't you going to teach us anything?" a student will fire back.

"I will be happy to answer any specific questions you have that relate to the task Mr. Henderson has given you to do," is my response.

And so begins a dialogue concerning how to create the various parts of the Web site. The great thing about giving students tasks in the form of a problem is that problems lead to questions. Students learn to ask the right questions because I don't give them anything more than a rough outline of the problem to be solved. And those questions lead to ownership of the task by the students. And that ownership leads to independent thought, which is our goal.

Students soon learn the importance of being self-reliant because I decline to answer any of their questions. For example, when I return to my role as a classroom teacher after role playing Mr. Henderson, students will invariably ask me questions that only the role-play person can answer. I reply that because I wasn't at the meeting, I am not able to answer those questions. When students realize I won't bail them out in subsequent tasks, they begin to learn to analyze the task as soon as it is presented, to formulate significant questions, and to overcome their shyness about asking their questions to get the answers they need to accomplish the task successfully. An added bonus is that students learn to take full and complete notes of meetings with role-play personalities. I don't have to drone on and on about the need for doing this—experience is the best teacher.

When I present students with a new task, I usually ask them to act as a person in a real-world job. I have discovered that they love the chance to try out different roles from the working world. Young people are trying to figure out where they fit into this thing called life, and they eagerly take on the roles I ask of them. It's like "playing" real life. By providing them an opportunity to take on a role from the working world, students begin to think about the kinds of tasks people in those jobs do, which has led to some unexpected side benefits. I have been pleasantly surprised at parent/teacher interview night when parents will tell me that their son or daughter has been asking them questions about what they do at work because it relates to a role I have asked the students to assume.

Transforming Your Curriculum With Real-World Role Play

The real-world simulation/role-play approach just discussed can work with any material you need to cover in your classes. Just take an outcome or group of outcomes from your curriculum guide and create a problem for your students to solve. Here are the keys:

- The problem must address the outcomes in the curriculum guide. If the problem is solved with all of the specifications addressed, then the students will have covered the required material in the course.
- The problem should have a real-world link. The scenario doesn't have to be a business problem; it could have to do with someone's personal life, recreation, personal finances, local or national politics, the environment, a pressing global issue like world hunger, and so on.
- You must ensure that you do not give the answer when presenting the problem.

CHAPTER THREE

Teaching Students How to Solve Problems

"If you give a man a fish, you feed him for a day. But if you teach a man to fish, you feed him for a lifetime." This old saying illustrates the significant difference between the value of process and content—the skill of fishing (process) remains useful long after a single fish (content) has been eaten. Processes empower people far more than specific content.

We immediately recognize the truth in this saying. As educators, we need to begin applying this truth more often in our classrooms. In the early grades especially, we are familiar with teaching process skills in a number of areas. When we teach students to read, write, and do arithmetic, we are actually equipping students with process skills. We don't just teach students how to read a single word or a story; we teach them the process of reading to empower students to go on and read an infinite variety of material. We don't just teach students how to write a particular story or an essay; instead, we teach them the process of writing so they can go on and write myriad communications ranging from letters to lab reports. Likewise, we don't just teach students how to add up a single column of numbers; we teach them the process of adding so they can go on and do calculations they have never encountered before. The power is in the process. Even if the specifics change, the process remains valid.

We should be careful, however, not to think that the tried-and-true process skills of reading, writing, and arithmetic comprise the complete set of process skills that students require for life today. Teachers must consider adding another equally important process skill if we hope to give our students all that they will need to survive in the world of the 21st century. To equip young people with the thinking skills that will enable them to apply their learning to real-world situations, we must also embrace teaching the process of problem solving. What young people need when they begin solving problems is a general step-by-step process to follow that will empower them to tackle any sort of problem.