"We" Have What "They" Want

Practical Elementary School Technology Activities

As members of the technology education profession, we believe that technology education is important for all elementary, middle school, and high school students. We believe that the experience of technology educators may be a valuable resource for elementary teachers.

If elementary educators seek relevance in themes and in instruction, they may be well advised to consult technology educators (David, 1997; Kieft, 1997). If technology educators hope to become seriously involved in the education of young children, technology activities must be reconsidered, and perhaps redesigned, to meet the needs of elementary education.

It is important to look at the reasons elementary educators may be receptive to elementary school technology education (ESTE). These include the need for relevant, authentic experiences in the elementary classroom and an interest in teaching children about technology.

**Relevance**

One reason that practical technology activities have a place in today’s elementary classroom is the continued concern for making education relevant to students. ESTE almost always involves students in hands-on activities which orient them to the human-made world. One of the needs ESTE can address in the elementary classroom is relevance—and it can do so in a way that engages students and encourages them to express themselves as individuals.

Students want and need work that enables them to demonstrate and improve their sense of themselves as competent, successful human beings. This is the drive toward mastery. But success, while highly valued in our society, can be more or less motivational. People who are highly creative, for example, actually experience failure far more than success. (Strong, Silver & Robinson 1995, p. 10)

"Basically," Foster (1995) noted, "educators are being asked to develop and deliver student-centered, action-oriented curricula" (p. 45). To technology educators such as McCade (1995), the

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qualities the educational community seems to be searching for may already exist in the form of technology education. “Everyone in education seems to be agreeing with precepts long held by technology educators” (p. 38). The sense is that education should be related to the “real world,” and that ESTE can help make the connection.

**Technological Content**

At the same time, elementary educators are hearing calls for more content about technology. This statement from the National Council for the Social Studies (NCSS) is a good example.

Young children can learn how technologies form systems and how their daily lives are intertwined with a host of technologies. They can study how basic technologies such as ships, automobiles, and airplanes have evolved and how we have employed [them].” (“Ten Thematic Strands,” 1994, p. 367)

It is clear to NCSS that technology is more than computers—a distinction the technology education field has long labored to make. This call for technology content is not completely separate from the call for relevance in education. Technological topics, such as transportation, are often chosen by teachers to deliver important content, as well as organize the objectives of the core curriculum to make learning more relevant. “As for topics that relate to students’ lives, the connection here cannot be superficial; it must involve an issue or idea that is both manageable and unresolved” (Strong, Silver & Robinson, 1995, p. 10). There is no shortage of manageable and unresolved topics in technology education!

Members of the technology education profession believe that technology education should be part of the experience of all students at all grade levels. Recently the National Science Foundation and NASA jointly funded the Technology for All Americans Project (1966), which considers technology education to be as important in Kindergarten as it is in 12th grade. Similarly, ITEA and the Technology Education for Children Council successfully launched an elementary-level journal, *Technology and Children*, to address the specific needs of the elementary teacher. Instructional materials development has been undertaken by the Center for Implementing Technology Education and other local and state-sponsored initiatives.

Since ESTE is new to most elementary schools, it is not surprising that it is primarily being implemented as a series of activities. Many published ESTE activities have been borrowed, either from elementary education or from secondary tech ed. This article will look at two elementary activities and compare them to similar tech ed activities.

**Example I—The “Dream House”**

Joan Wallace (1993), who teaches at an elementary school in California, has her students design their own dream houses (p. 53) as part of a mathematics unit in which they learn about area and perimeter. Indiana high school teacher Peter Cook (1994) also has students design their dream house (p. 46) as part of his architecture class. He has them calculate such figures as cost per square foot, the size of a down payment on a loan, housing payment ratio, and the like. Both teachers assign students to design and draft the houses on graph paper and base their calculations on their own designs.

“Of course,” Cook wrote about high schoolers, “they design it too large, too elaborate, and too costly” (p. 46). Cook coaxes his students with reality worksheets on which they figure the following:

- how much the home will cost with and without extras,
- their likely personal income and outlay when they begin their adult lives using salary figures found in the *Occupational Outlook Handbook*, and
- their monthly housing payment ratio used to determine whether they would be house poor if they actually purchased their dream house.

Students ultimately draw more realistic plans. In this activity, Cook says, students must deal with reality (1944, p. 47).

Meanwhile, Wallace’s elementary students have one week to complete their dream houses. And whereas Cook’s students often include tennis courts, Olympic-size pools, air strips, and so on, (1994, p. 46), the ideas of Wallace’s students have ranged from indoor basketball courts to dance studios and pool pavilions (1993, p. 53). The challenge she gives them is to design a home on an unlimited budget. Students are required to observe rules such as a specific
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scale (1/4" = 1") and basic drafting conventions. Since this is a math activity, students must outline perimeters in specific colors and calculate the area and perimeter of each room. At the end of the week, Wallace displays the finished designs so students can garner the oohs and aahs their houses deserve (p. 53).

Despite the obvious differences between the students’ activities, they have a lot in common such as both:

- involve designing a dream house,
- encourage student creativity at the beginning,
- specify guidelines for how the project is to be executed,
- emphasize planning before doing, and
- heavily emphasize having students do practical math.

The clearest distinction between the two activities is that the high school project derives its practicality from having students think about actually living in the house while the practicality of the elementary school activity is in the perimeter and area measurements. It might seem that the high school activity is more focused on the real world, because students are challenged to design an economical home—a task which might be asked of an architect in the real world.

The elementary school activity emphasizes architectural math skills such as detecting areas, necessary for real world activities such as ordering carpeting. The fact that elementary children determine the areas of rooms in their house does not at all reduce the practicality of the activity. In fact, the fancier it is, the more challenging the math will be.

Several modifications could be made to the elementary activity to make it even more of an ESTE activity. For example, students could make a three-dimensional model in addition to the drawing. Or, the various careers involved in construction could be incorporated into the activity.

**Example II-Chocolate Chip Cookie Activities**

The purpose of the first of the following activities is to deliver academic skills; the purpose of the second is to advance students’ knowledge of technology.

The goal of the academic activity is to collect, classify, summarize, and compare data, and to apply this information to describe a typical chocolate chip cookie. Evered (1994) discussed the activity in which children determine the number of “chips” visible. She pointed out disagreements would arise, which the teacher would need to settle (p. 114) and mentioned the following examples:

- What if there is a broken chip—does it still count?
- Does an obscured chip count?
- Should a cookie with too few chips be “traded in?”

Meanwhile, Frederick (1995) described a technology activity in which older elementary students “mine” chocolate chips. They are given a specific amount of play money to purchase cookies and mining equipment such as paper clips, toothpicks, etc. They are paid for the “ore” they mine. The income is used to purchase more land to mine and reclaim the land (cookies) they’ve mined. Several rules are observed, such as “players cannot use their fingers to hold the cookie. The only thing that can touch it are the mining tools, and the team with the most money at the end wins” (p. 50).

Here are some similarities and differences between the 2 activities.

**SIMILARITIES**

- Both use chocolate chip cookies.
- In both, students determine the quantity of chips in the cookies.
- Both explicitly attempt to be relevant and interesting.
- Both explicitly expect students to apply observation, data collection, and analysis skills.

**DIFFERENCES**

- The academic example is presented seriously while the technology-ed example is referred to as a game.
- In the academic example, students inspect the cookie for superficial chips; in the tech-ed example, they physically delve into it.
- The tech ed activity is intended to replicate an industrial process; the academic example is self contained and not intended to be symbolic of real world activities.
- The objective of the academic activity—to collect, manipulate, and present data—is abstract whereas the tech ed’s is to make as much money as possible. (Frederick, 1995, p. 49)

These differences say a lot about differences in intent between elementary and technology education. They also suggest that these activities are somewhat representative. For instance, in the tech ed example, students design and
build their own solutions to the problem at hand. In the academic example, the results will be flawed if each student does not use the same method in solving the problem. Similarly, in the tech ed activity, students are required to work in cooperative groups which compete against each other—the technology activity is essentially a contest. In the academic example, students work individually, and at the end, combine their results. The rules for the tech ed activity are specified in advance, and in nearly legal terms. In the academic example, the rules are made up as the activity progresses.

**Final Thoughts**

Using traditionally secondary technology activities at the elementary level is sometimes very appropriate. One of the main reasons that many technology activities are thought of as secondary is that there has never been a widespread effort to implement ESTE—so even very basic technology activities are used with secondary students. The intent of secondary activities, however, may not always parallel the intent of elementary activities.

For example, in secondary technology courses, the teacher’s primary concern is technological content and processes. Teaching academic content is rare, except when needed to accomplish a specific task. An elementary teacher’s primary concern is the development of the child and integrating content and processes in thematic instructions. Thus, their focus may be equally on math, social studies, or technology in any given activity.

While there may be many similarities between activities at the elementary and secondary levels, or between academic and tech ed classes, the differences should not be ignored. To make valuable contributions to the education of elementary children, technology educators must understand the differences. With this in mind, we believe that ESTE can and will significantly enhance elementary education in the U.S. [1]

**References**


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