Technology Education: Integrating New Approaches

By Raymond O. Swensen

What is important in the training of people who must function in a technological society? Gerald Coy describes technical education in the following manner:

> When today's society refers to technical education, they are referring to the knowledge one must have to understand and apply the technologies about him. Educators need to teach fundamental concepts which do not change in preparing students to meet the demands of tomorrow. . . . Education that is technologically relevant for a society is one which must provide basic technical literacy and prepare all students to participate in evaluating the value of the new technologies.[1]

A holistic attitude is emerging that favors technology education at all levels. The prevailing philosophy can be summarized as follows: first, people must become technologically literate. Second, at an appropriate time in their educational experience they need a comprehensive view of technology in four basic areas: (1) communication, (2) construction, (3) manufacturing, and (4) transportation. Third, vocational training must be made available in the technology area in which each person is interested. This can be accomplished at the high school or college level, although even in elementary school students can learn about technology and use its processes in hands-on projects.

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Most technology education commonly recommended today can be accomplished using the approach suggested above with little adjustment of facilities or equipment, providing a conventional industrial arts program is already in place.

Training for a technological society is needed at all levels of the educational experience. Therefore, we should ensure that students receive technologically oriented training in every Seventh-day Adventist school. A successful technology program on the secondary level will incorporate the following points:

1. A knowledge and appreciation of the importance of technology.
2. The safe, efficient application of tools, materials, processes, and technical concepts.
3. The discovery and development of individual talents.
4. The integration and application of other subjects such as math, science, and English.
5. The nurturing of creative abilities.
6. The developing of techniques to deal with the forces that influence the future.
7. Adjustment to the changing environment.
8. Training in technology awareness to produce wise consumers.
9. Development of criteria to help students make informed career choices.[2]

Teachers are needed who fully understand the philosophy of technology education and have been trained so that they can perform comfortably in these areas. Too many teachers are still operating in the 1960s, teaching only woods, metalwork, auto mechanics, and drafting. This is not to say that these subjects are not important, but with the emergence of the new technology education curriculum of communication, construction, manufacturing, and transportation, processes and curricula must be combined so that there is a more comprehensive understanding of the technology of today. Teachers need training in the new curriculum in order to teach it, as it requires a completely different approach. We can probably assume that in SDA teacher-education programs, technology education reflects this new curriculum. However, graduates of 5 to 20 years ago may need retraining through workshops and in-service education.

Perceptions of Industrial Arts

The curriculum of technology education, like any other subject, is only as good as the teacher. Walter B. Waetjen says, "The curriculum is what happens when the teacher closes the classroom door and interacts with young people." He questions how parents, educators, business leaders, and school board members perceive industrial arts education.

> Do they perceive it as developing technological literacy in young people or as a "shop" experience in which artifacts for the home are produced? If the latter view prevails, and there is some reason to believe that it does, then industrial arts education is in for hard times.[3]

Based on this, then, we can assume that the subject needs new curriculum approaches and teachers who exercise creative skills to prevent the above-mentioned hard times. The teacher can coordinate the learning experience to ensure a hands-on approach to technology. Teachers who function as educational leaders will not concentrate wholly on the facts of the past in studying technology and industrial arts, but will focus students' attention on learning the fundamentals and encourage them to think for themselves.

A look at the rapidly emerging technologies of the modern age makes it easy to see why teachers in specialized technological areas must keep abreast of the rapidly changing times. Only a few short years ago assembly lines required human beings to do all the work. Today robots are putting cars and various other items together virtually without the aid of human hands. A small desk-top computer can hold what used to require an entire library to store. By the year 2000 we may have jet airlines traveling 160,000 feet above the earth at speeds more than double those of today's supersonic jets.

Vocational education is a part of technology education. We should seriously consider this inspired statement:

> Manual training is deserving of far more attention than it has received. Schools should be established that, in addition to the highest mental and moral culture, shall provide the best possible facilities for physical development and industrial training.

The same writer adds, "We must not be narrow in our plans. In industrial training there are unseen advantages which cannot be measured or estimated."[4]

Who Needs It?

The question may legitimately be asked, Why do teachers, preachers, homemakers, doctors, and lawyers need technology education?

Perhaps the question really should be, What doctor, lawyer, or homemaker is not actively involved in communication, construction, manufacturing, and transportation in his or her daily life? Not everyone can read a blueprint, but that skill is an integral part of communicating in today's world. Most people buy a home, or at least live in one, and need to understand construction to some degree. No one could question the need for knowledge about transportation and its complications in today's world. Furthermore, everyone needs to understand and appreciate a number of aspects of manufacturing when purchasing manufactured items, in order to decide whether they are useful and safe. Therefore, it is clear that technology education is a necessary part of the general education of every student, and indeed, every citizen.

Not all schools are equipped to provide every area of vocational education. The faculty and school board must decide which areas are most appropriate for their particular region. It might be well for the church to review and coordinate vocational training programs on the secondary level. In this way a more complete program could be developed with larger sums being spent on tools and equipment for specific schools as they develop particular vocational areas. This would allow students to pursue their vocational goals in a better-equipped environment.

Picture removed

College-level Technical Training

In this writer's view, most intensive vocational training should occur at the postsecondary level. This brings us to the point of considering technical training at the Adventist college or university.

Not every Adventist college in North America provides technical

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added are not in the areas being recommended or developed by the industrial arts profession.

In general, industrial arts was perceived to be closely allied with the general-education curriculum, to be an important component in the educational program of college-bound students, and was seen as necessary for all students.

Few significant differences can be detected between the SDA and the public school industrial arts programs.

Neither SDA principals nor chairmen seem to be content with the current emphasis given to the purposes of industrial arts.

Seventh-day Adventist chairmen do not sense strong administrative support for their programs. The situation is the opposite for public school industrial arts chairmen.
—P. John Williams. □

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Technology in Finishing God's Work

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evangelism. Educators must make sure that the young people under their tutelage receive good reading, writing, and speaking skills as well as the ability to use new methods of communication technology.

Conclusion

Despite the amazing advances in communication technology, unanswered questions still challenge and fascinate us. What will the future hold? As teachers, how can we prepare our students to meet the challenges that will confront them? The training of Adventist young people for the future must include an awareness of the impact of technology on their lives, and how and where they can use their skills to help finish God's work.

If the Lord sees fit to allow time to continue before His return, major changes are coming in the future of technology—changes for which we must prepare ourselves and our students. □

FOOTNOTES

[1] Edward Cornish, *The Study of the Future* (Washington, DC: World Future Society, 1977), p. 3.

[2] T. K. Derry and T. I. Williams, *A Short History of Technology* (New York: Oxford University Press, 1960), p. 216.

[3] M. Kranzberg and C. W. Pursell, Jr., *Technology in Western Civilization* (New York: Oxford University Press, 1967), vol. I, p. 85.

[4] C. Singer, E. J. Holmyard, A. R. Hall, and T. I. Williams, *A History of Technology* (Oxford: Oxford University Press, 1958), vol 4, p. 660.

[5] D. S. L. Cardwell, *Turning Points in Western Technology* (New York: Science History Publications, 1972), p. 173.

J. Gregory and K. Mulligan, *The Patent Book* (New York: A & W Publishers, 1979), p. 71.

[6] J. W. Oliver, *History of American Technology* (New York: The Ronald Press Co., 1956), p. 433.

[7] T. I. Williams, *A History of Technology* (Oxford: Oxford University Press, 1978), vol. 7, p. 1255.

[8] M. Kranzberg and C. W. Pursell, Jr., *Technology in Western Civilization* (New York: Oxford University Press, 1967), vol. 2, p. 304.

[9] *Ibid.*, p. 307.

Technology for Elementary Students

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Local church members are usually glad to contribute items. An announcement in the church bulletin or school newsletter will often bring good results.

Conclusion

To ensure that each technology education activity yields maximum benefit to the learner, the following steps are recommended:

1. Select the activity in terms of students' capabilities, readiness, and interest as well as its potential value to the unit being studied.
2. See that the activity is adequately planned.
3. Instruct and direct the students through successful completion of the project.
4. Conduct such summarizing activities as necessary to ensure effective learning.[8]

Christian educators have the responsibility of providing a complete education for every student. Technology education activities in the elementary school can enhance basic learning experiences in a number of ways. By introducing technology education into the classroom, a teacher can offer an exciting, stimulating, and more effective educational experience. □

FOOTNOTES

[1] W. R. Miller, and Gardner Boyd, *Teaching Elementary Industrial Arts* (South Holland, IL: The Goodheart-Willcox Company, Inc., 1970), p. 11.

[2] Ginger Ketting, "The Benefits of Technology Education in the Elementary Classroom" (Unpublished paper prepared for a handiwork activity class at Walla Walla College, College Place, WA, 1985), p. 5.

[3] Miller and Boyd, p. 16.

[4] Mary Margaret Scobey, *Teaching Children About Technology* (Bloomington, IL: McKnight and McKnight Publishing Co., 1968), p. 12.

[5] Miller and Boyd, p. 10.

[6] Scobey, p. 11.

[7] *Ibid.*

[8] Miller and Boyd, p. 34.

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training in all areas. This would be economically impossible. Each college offers some areas at varying levels of experience. For example, a person interested in studying about computers could go to almost any Christian college and gain adequate technical training for a career in this area.

Because of the high cost, however, specialties are offered only in restricted areas, primarily due to interest on the part of the constituency. Another example is auto mechanics. Not every North American Division college offers this training on the level needed to enter the job market; however, a number do.

An example of a more limited area of study is aviation. Several colleges and academies throughout North America offer aviation flight training (e.g., Andrews University, Pacific Union College, Walla Walla College, Blue Mountain Academy, Thunderbird Academy, and others). However, only one institution—Andrews University—offers an FAA-approved Airframe and Power Plant Mechanics School. Only a few people within our church system are interested in such intensive technical training; therefore, repetition of such a program would be impractical.

Promotion and Student Recruitment

The church must make a concerted effort to inform prospective students of the variety of technical programs available to them, and the many ways of financing such education. Every young person who desires technical training—and even those who haven't decided what career to pursue—should receive information about the wide variety of opportunities for such education in a Christian environment. □

FOOTNOTES

[1]Gerald W. Coy, "New Dimensions for the Changing University" (Unpublished paper), p. 8.

[2]The American Industrial Arts Association, "Technology Education: Direction for the Profession," *Technology Education, A Perspective on Implementation* (Reston, VA, 1985), p. 25.

[3]Walter B. Waetjen, "Opportunities and Problems for Industrial Arts," *Man/Society/Technology,* vol. 42 (May/June, 1983), p. 5.

[4]Ellen G. White, *Education* (Mountain View, CA: Pacific Press Publishing Assn., 1942), p. 218.

Why Teach Technology?

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elements could be left to their initiative, research, and experimentation. For example, the parachute storage and release mechanism could be devised by the student.

Schools that continue to teach industry will in fact be teaching history, and their students will be learning from the past rather than preparing for the future.

In order to understand the theory related to this unit, the student would study solid fuel rocket engines, propellants, oxidizers, binders, and the reasons for different materials being used in the engine. Engines could be tested to chart their maximum thrust and effective burning time. Students can construct devices to measure altitude and time, after which the data can be used to make needed design modifications. Through the use of batteries and switches, students learn basic electronic principles as they construct the launching mechanism. The model rocketry project also helps students learn to use tools and material, offers them a leisure-time hobby, and provides insights into one of today's technologies.

Communications

A unit in the communications course could revolve around the construction of a crystal radio, similar to the one illustrated in the figure below (materials can be found in local electronic supply stores). Students will begin to learn about communication by using electronic machines, while also developing skills such as sawing, filing, etching, soldering, and drilling. They will become acquainted with electronic symbols used in schematic circuit diagrams, and understand the meaning of *carrier waves, modulation, demodulation, frequencies,* and other terms relating to electronic communication.

Construction

A course in construction can teach students the major concepts associated with various types of

SCHEMATIC DIAGRAM OF A CRYSTAL RADIO