Industrial Arts Revisited: An Examination of the Subject's Continued Strength, Relevance and Value

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There has been a considerable amount of work, position papers and professional pressure in recent years expressing the need for technology education. This effort has often rallied around justifications which diminished or ignored the contributions and continued existence of industrial arts programs. Considering the recent trends and mandates toward technology education, have those educators previously initiated into industrial arts been indoctrinated to teach subjects such as woodworking, only to find the subject matter has no contemporary relevance and can no longer exist? In essence, are the curriculum, activities and equipment of industrial arts temporal in nature and of minimal educational value, or was it simply politically incorrect to discuss or support the subject?

This paper will attempt to clarify some of the arguments for and against industrial arts, as presented by proponents of technology education. In the scope of this discussion, an alternative view of the strength, relevance, and value of traditional industrial arts is presented. Concurrently, assumptions about technology education as being the *only* program in this arena of instructional worth are challenged. Concluding remarks will suggest a need for middle ground encompassing professional inclusion and program appropriateness.

As a former industrial arts woodworking teacher in the late 1970s to mid-1980s, and now in a university setting preparing teachers, I have been wrestling with the changes that have been occurring. I have witnessed both public school and teacher preparation programs in industrial arts/technology education drastically fall in numbers (Volk, 1993), and programs that were full of tradition being attacked. This author is not against the tenets of technology education, for who would argue against the need for students to understand technology? Rather, as a former industrial arts practitioner, I am convinced there were, and still are, aspects of industrial arts having educational value for today's youth.

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Evolutionary or Revolutionary?

A central theme rationalizing the move toward technology education has been that technology education evolved from industrial arts. Claims to this effect have been promoted by publications such as *Technology Education: A Primer* (Colelli, 1989), *The 50th Anniversary Edition of The Technology Teacher/ International Technology Education Association* (International Technology Education Association, 1989) and *The Foundations of Technology Education, 44th CTTE Yearbook* (Israel, 1995).

By using the term “evolution,” two insinuations are made. First, in the grand march toward educational development and sophistication, technology education is placed in a superior position above industrial arts. Second, in this hierarchical scheme, those that still teach industrial arts are, by default, considered “neanderthalic” in their approach, content and relevance.

Viewed through the theory of change often associated with social Darwinism, evolution represents progress and superiority. Despite this common perception, social Darwinism never concurred with the specialist’s understanding of evolution as being a naturalistic and non-directional process of change. In fact, as Novikoff (1976) pointed out, evolution need not always be in the direction of progress. In this same manner, the assumed hegemony and superiority of technology education can be questioned.

If one were to further challenge this premise and assumption of progress through evolution and argue that technology education is revolutionary, as opposed to evolutionary, then *both* subjects can coexist-exist. For example, the development of social studies as a new subject using history, anthropology, geography, and so forth, as a foundation did not preclude or necessitate the elimination of the latter subjects. So too does the development of technology education not necessarily preclude industrial arts from still being taught.

As distinct subject matter, overlaps can occur. These overlaps reflect the tools, materials, processes, objectives, definitions, and activities common to both programs. Figure 1 illustrates how industrial arts and technology education share common features.

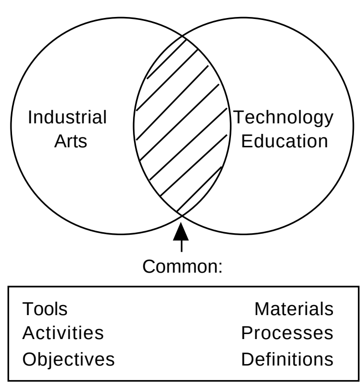

*Figure 1***.** Common features of technology education and industrial arts.

Although commonalities exist between the two subject areas, questions remain as to the degree of overlap. Should a great deal of overlap occur, then implications can be made about professional inclusion and direction. If there is little overlap, then perhaps discussion should be shifted to individuality, uniqueness and professional autonomy.

Academic Integration

Academic integration is a buzzword that seems to differentiate the way industrial arts and technology education are taught. Proponents now claim that technology education is the “place to put it all together.” However, teaching in this holistic manner is not a new concept, nor unique to technology education.

Edmondson’s (1987) examination of the nature-study movement in the early 1900’s described the integration and coordinating efforts industrial arts had with other subjects. Influenced by a growing awareness of conservation, the “Bird House Era” of industrial arts combined subjects of mathematics, geography and English in the holistic study of birds. Fryklund's (1941) status report on *Industrial Arts Teacher Education* specifically examined the amount of integration that existed with academic disciplines and commented on the benefits of such efforts. From those responding to his survey, 63 percent were using integrative techniques in their instructional process, with 41 percent participating with academic departments. According to Fryklund, “these co-operations were in varying degrees, from cutting stock with shop equipment to detailed efforts at combining subject matter into units” (p. 90).

Caution should be made when placing too much justification for a curricular area on its claims of being able to represent *all* disciplines. An argument can be made that if technology education can teach these other disciplines, then other disciplines can teach technology. Evidence of this trend can be seen with subjects such as “Principles of Technology” being taught in either science (especially physics) or technology classes. Furthermore, math and science disciplines are now using robotics, CAD and modular hardware typically found in technology education in order to provide concrete applications to their lessons. English classes, now often called communication, incorporate video production, desktop publishing, and other “tools” found in technology education's communication cluster. In this manner, technology education's hardware and activities have been easily incorporated into other disciplines, thus minimizing its unique contribution and necessity in a school setting.

What It Is, Is What It Is Not

Definitions of the subject have, in many ways, changed little from Bonser and Mossman's (1923) early descriptor of industrial arts being “a study of the changes made by man in the forms of materials to increase their value and of the problems of life related to these changes” (p. 5). Despite academic endeavors to massage and reinterpret the definition since that time, Foster (1994) noted “what the profession defines as ‘technology education’ - in an attempt to distance it philosophically from ‘industrial arts’ - is essentially the definition suggested many times in the past for industrial arts” (p. 16). For instance, the definition supplied by Wright and Lauda and accepted by the *Foundations of Technology Education Yearbook* (Bensen, 1995) stated that technology education is “an educational program that assists people [to] develop an understanding and competence in designing, producing, and using technology products and systems, and in assessing the appropriateness of technological actions” (Wright and Lauda, 1993, p. 4). From the 1923 and 1993 definitions, both industrial arts and technology education can be categorized in simple terms of process (i.e., changes in materials/design, produce, use) and outcomes-oriented (i.e., study problems of life/assessing appropriateness). Simply put, the definition has not changed much in 70 years.

However, noticeably absent from recent definitions of technology education is the general scope and intent of the subject. In a departure from the classic definitions articulated by Maley (1973) and Wilber and Pendered (1973), in which the non-vocational aspect of the subject was saliently described in terms of being “general education,” recent descriptors conspicuously omit this aspect. Now phrased in terms of being just an “educational program,” clarity of meaning has given way to obfuscation. One explanation for this omission may be the availability and infusion of Federal Perkins vocational funds and School-to-Work monies into technology education programs. For reasons of political posturing, strategic importance, and financial survival, vocational funding would be jeopardized if technology education was to be broadly characterized as part of general education.

Despite attempts to define and promote the term “technology education,” confusion still exists; not only within the profession, but among the general public. For instance, the Technology-Edu listserv, the first electronic mailing list for the field of technology education, clearly states in its “welcome” statement that it is a forum for issues centering around “industrial arts” and “technology education.” Even with this admonishment, the listserv regularly becomes clouded by discussions centered on educational technology and computer utilization. Similarly, the electronic posting of the *Journal of Technology Education* is located under an Internet directory which includes an eclectic variety of educational technology and technology trade magazines. Recognizing this continuing uncertainty of terminology, the Executive Director of the International Technology Education Association (ITEA) stated, “confusion is everywhere! ... it is safe to say that most educators don't know the difference” [between educational technology, technical education, and technology education] (Starkweather, 1993, p. 2).

To alleviate this confusion inside and outside the profession, technology educators are more likely to define their subject in terms of what it is *not*. This is to say: it is *not* woodworking. Much of this exclusion no doubt lies with the fixation, fascination, and fondness of “new technology” at the expense of anything that resembles “old technology.”

Edutainment

Technology education has placed great emphasis on incorporating activities that purport to be state-of-the-art. Most identified with this learning environment are the modular systems being introduced into the technology education curriculum. This “high tech,” computer-related, and often multimedia-centered instructional hardware may be in reaction to educators’ fear of inadequacies to compete with the computer and video-driven environment with which students are most familiar. In a similar critique, Zuga and Bjorkquist (1989) suggested that “in many instances flashy equipment has been used to camouflage inferior teaching” (p. 70). What has often been the result is the reliance on high technology, that is, computers, and the inclusion of equipment with accelerated built-in obsolescence.

Contrast this approach with the relative stability of traditional industrial arts subjects such as woodworking, where many of the tools, materials, and techniques have stayed fairly constant. Granted, some technological advances have been made in calibration, composites and production, however the basic approaches remain timeless. This is not to condone teachers who thought their limited project selection was timeless, that is, your older sister or brother made the same knickknack shelf as you did. There was too much of this stagnation. Yet, offering students an experience that is unique to what they receive in other learning situations, plus introducing them to practical skills (Raspberry, 1989) is a powerful instructional setting and experience.

Questions about the educational value of modules have been raised by several authors. Petrina (1993) argued that modular approaches are organized and constrained by the equipment and devices contained in such programs. He also suggested modular programs were shaped by dated learning theory and reflected mechanistic assumptions about education. Harris (1994) also expressed concern that a number of decisions about using information technology and their associated measurement, control, simulators, data acquisition equipment may have been made by educators “without proper consideration of the longer-term implications” (p. 24).

Toomey and Ketterer (1995) further argued that the use of computers, including multimedia to enhance learning may be more promotional than investigative. An example of this promotional research can be found in the study conducted by Dobrauc, Harnisch and Jerich (1995) for Synergistic Systems labs. Synergistic Systems requested the study as “academic proof that their system was a better way to teach and a better way for students to learn” (p. 4). Despite not stating sample size, using a research methodology developed over 30 years prior to the research, and not having outside objective review, the researchers concluded that “it is a system students respond to and appear to like” (p. 13).

However, a more serious and immediate criticism is the role vendors have played in developing curriculum. With vendors introducing and updating modules each year, in a sense the curriculum is dictated by the supplier, not the user. The acceleration and influence of vendors in determining curriculum can be identified by examining recent ITEA conference programs. In the 1984 Columbus, Ohio conference, 18 percent of the presentations were conducted by the commercial (vendor) exhibitors. By 1994, the Kansas City, Missouri conference had 30 percent of the presentation topics conducted by vendors in the form of “Action Labs.” Such presence at national conferences no doubt influences teacher purchasing and curriculum decisions. It also gives legitimacy to the vendors' efforts through these professionally-sanctioned meetings.

Build 'em, Race 'em, and Smash 'em

Competition is another buzzword that captivates recent technology education curriculum design. Many technology educators seem determined to have students compete in “design challenges” as an initiation into the real world of work and threat of global economic competition. What has been the result in many instances, is a reliance on too-few, non-relevant, and overly-used projects that tragically have no utilitarian or lasting value.

The Technology Education Advisory Council (1988), affiliated with ITEA, tried rallying educators to this competitive mode of education through their “Call to Action.” They stated: “The issue here is not whether technology education is good or bad; not whether it should or shouldn't be offered; or not how it is to be taught. The issue here is whether the United States will maintain its worldwide competitive lead in technology” (p. 21). A particular philosophy of the role of education is evident in this statement. Are schools and subject matter to be viewed as tools of capitalism, or should they be the foundation of democracy? Competition can more easily be associated with the former.

Contradictions in the simplistic justification and endorsement of competition are most evident when some of our chief “competitors” are examined. For instance, Japan and Hong Kong, whose people we admire for their technological sophistication and productivity, still encourage their youth to take courses in woodworking and other industrial crafts. These courses help foster skills in problem-solving, self-discipline, artisanship, and tool manipulation. Furthermore, through the creation of a competitive environment where “my success requires your failure,” research shows that competition can undermine self-esteem and disrupt relationships (Kohn, 1992).

In a sense, competitive events such as CO2 cars and model bridge building have become the pump lamps of the 90’s. Not only questioned on their potential gender bias, (racing cars) and educational relevance (how many bridges *really* need to be built), the homogenizing curriculum reduces program individuality, uniqueness and options. Such activities also tend to make programs vendor-dependent for prepackaged materials and supplies to continually justify and utilize their maglev, wind tunnel, race track, and bridge-testing apparatus (Petrina, 1993).

New Tricks and Old Dogs

The health of the profession has been failing in terms of the numbers graduating from teacher preparation programs and secondary school teachers implementing technology education. Several studies illustrate these trends.

University teacher preparation programs for technology education have seen a decline in student numbers (Scott and Buffer, 1995). Redesigned program emphases to non-teaching options have had their effects (Volk, 1993), yet other fundamental problems may exist. If one were to examine exactly what is being taught in secondary schools, surveys conducted as recently as 1992 still place woodworking and other industrial arts courses in the majority (Dugger et. al., 1992). This continued appreciation of the value of traditional industrial arts was supported by Jewell's (1995) state-wide survey of North Carolina principals. In this research, Jewell found principals disagreed with the statement that “programs that focus on woodworking and metal working is [*sic*] an out-of-date concept” (p. 22). What this suggests is that there is support for industrial arts teaching, but this support is not being met by teacher preparation programs. Reflecting on this dilemma Miller (1988) noted recruiting new teachers is difficult enough, but “the changing of the name into something else makes it even harder to recruit when you have to tell the prospective professional that the profession he/she is interested in has changed its name and direction” (p.4).

Teachers in the field may be proving resistant to technology education changes. For instance, Rogers' (1992) study on the transition to technology education by industrial arts teachers examined their acceptance using a Stages of Concern Model. This model, developed by Hall (1979) maintains that the feelings, attitudes, and perspectives a person has, must go through several stages or processes as they consider, approach and implement use of an innovation. Rogers found that the majority of industrial arts teachers had failed to accept technology education, and that older and more experienced teachers were more likely to refocus it before accepting it.

Perhaps a further explanation of why new teachers are not entering the profession or why experienced industrial arts teachers are not accepting the changes can be found in the work of Wicklein and Rojewski (1995). In their study of psychological type of industrial arts and technology education teachers they administered a Myers-Briggs Type Indicator personality profile and Keirsey-Bates temperament type instrument. The authors found industrial arts teachers prefer introversion, sensing and judging orientations, while technology educators prefer extroversion, intuition and feeling orientations. These profile types help understand the professional inclinations of industrial arts teachers toward teaching technical skill development in their subject matter, as opposed to the problem solving, analyzing, modeling and experimenting emphases of technology education. The percentage distribution of personality types for technology educators as compared with the general population may also provide clues as to the specific personality type represented or attracted to the profession. In this regard, technology educators exhibited the extrovert, intuition, thinking/feeling and judgment categories (ENTJ, ENFJ) approximately twice as frequently as industrial arts teachers and three times more than the general population. In a sense, the profession may be trying to convert the wrong type of person to teach the subject.

The Real Objective

Single-parent families, declining test scores, and the crime rate for teenagers are indices which suggest students of today are a product of a society that is considerably different than 25 years ago. Yet, although education programs have changed since that time, societal needs have not differed to a great degree in the sort of person and participant a democratic society expects.

In a recent study on manufacturing firms conducted by Volk and Peel (1994), employers were asked to indicate the relevant importance of academic and vocational skills required of employees with only a high school diploma. Considering nearly 40 percent of the high school graduates do not enroll in either a two-year or four-year college after graduation (U. S. Department of Education, 1995), combined with the non-college bound population traditionally served by industrial arts courses (Ericson, 1960; Mikush, 1967), Volk and Peel's study pointed out critical areas of educational emphases. A general observation from the study found that skills related to affective domains; that is the attitudes, personalities, and emotions of employees were generally rated higher than those categories dealing with technical or academic concerns. In a similar manner, this emphasis on the importance of affective domains over cognitive and psychomotor domains was also reflected in Rogers' (1995) study of technology education curricular content as identified by trade and industrial teachers. Rogers found that trade and industrial teachers desire students who complete technology education programs to possess "affective domain attributes, such as dependability, punctuality, honesty, pride in workmanship, ability to cooperate with others, and a safe attitude" (p. 71).

In the case where state curriculum guides have become state curriculum mandates, concern should be noted for programs that stress competency-based and other "measurable" items as the only necessary outcomes. Working in a social situation, as opposed to individualized instruction (modules); having pride in your work as being a lasting accomplishment, as opposed to the temporal nature of prototype design and product testing (bridge building); and participating in a program that is built on success, as opposed to failure (competition) are some of the "hidden" experiences and skills students obtain in industrial arts. It may be that this "hidden curriculum" has always been the real strength and true value of industrial arts programs.

Implications

From the philosophical, structural and contextual comparisons made between industrial arts and technology education programs, there are three options for the profession. Each is plausible, yet not equal in implementation or desirability.

The first option is to continue ignoring any association and relationship between industrial arts and technology education. In a sense, this continues the status quo. Also, public and professional confusion over the content and definition of the subject would continue. Objections to this option are based on the fragmented professional base, declining programs and convoluted subject matter that currently exists.

The second option is to recognize the distinctly different objectives, content and approach between the industrial arts and technology education. In this scenario, the two subjects remain only loosely associated and interrelated, with very few common features (see Figure 1). Thus, if one were to walk into either an industrial arts or technology education facility, they would clearly recognize what particular subject is being taught through observing the particular tools, materials and activities. Under this option, teachers would be certified and teach either industrial arts or technology education. This would absolve any claims to subject matter orientation based on name only. This option would also necessitate the creation of a new professional association, solely representing industrial arts teachers. In this manner, a new professional organization would increase industrial arts teachers' political representation and posturing in educational fields. A major drawback from this option would be reduced strength in numbers when lobbying for any technical education-related support.

The third and most attractive option recognizes and accepts the common features of industrial arts and technology education (see Figure 1), thus minimizing their differences. Professional inclusion and tolerance on areas of definition, activities, tools, and objectives would characterize this approach. With industrial arts being criticized, stereotyped and challenged for its educational value, technology education has been myopically depicted as the rightful heir to all subjects relating to technical arts. As this paper has presented, the latter subject has limits on its claims of superiority.

Although industrial arts teachers and programs have been resistant to change, technology education success stories get the promotion and notoriety in professional journals, while the mass of those teaching traditional industrial arts are ignored. As noted by Ritz (1992), "during the 1970s and 1980s, members of our profession have authored numerous publications and have discussed their ideas on implementing technology education programs, programs that were much different than their forerunner, industrial arts" (p. 21). Even with the difficulty of finding model technology education programs to highlight as they are "few and far between" (Ritz, 1992, p. 21), profiles of the majority of industrial arts programs are conspicuously absent. This approach of ignoring the reality and majority of industrial arts programs must be professionally reconciled.

Despite pronouncements that "technology education" was chosen because "the term *industrial arts* gradually became an out-of-date description of what the profession wants to do" (Hughes, 1985, p. 3), perhaps the term "industrial arts" ought to continue, recognizing what most of the teachers are actually doing. Such an admission that there are successful industrial arts programs in schools that continue to offer students experiences that are unique, exploratory, built on problem solving, and character-building would go along way in reestablishing professional dialog and growth.

As another strategy for inclusion, it is proposed special interest groups and topics be encouraged in the American Vocational Association and International Technology Education Association to represent the specific professional interests of industrial arts teachers. This group would be expected to participate in professional debate about curriculum, activities, and strategies more relevant to their particular school setting.

A final strategy would be to explore greater common ground for collaborative efforts and direction. Recognizing and acknowledging the value of hands-on creative and design processes, the success-oriented nature of the curriculum, and the social implications of technology; perhaps a reexamination of the true goals of the subject matter should be made. A democratic society would most likely want students who are expressive, not passive; proactive, not reactive; and questioning, not accepting. To achieve these goals in the context of the broad influence of technology, then perhaps many instructional approaches and content areas can be used. Included may be topics of problem identification, environmentalism, social responsibility, ethics, gender equity, futurism, consumerism, and artisanship. It may be that both industrial arts and technology education have an obligation to prepare students in these important personal and social skills.

Conclusion

For industrial arts educators, their profession has not been a waste of time and resources in education. Industrial arts has maintained a position in schools and demonstrated its value despite claims that technology education is the only legitimate way for students to understand their technological society and themselves. For technology education to claim this exclusivity, is to deny industrial arts its historical significance, current implementation and future potential.

Rationalizing the need to implement technology education based on perceived evolutionary superiority or capitalistic requirements may not be convincing to others in the broader educational arena; given the problem of being non-discipline specific, continued definitional uncertainties within and outside the profession, and lack of acceptance by current practitioners who exhibit a different philosophical and professional orientation. This is not to suggest that those practicing industrial arts are immune from challenges, for negative public and professional perceptions are difficult to change. What will most likely will be required by industrial arts teachers is to proactively reestablish and convey to the public and educational profession a greater awareness, understanding and appreciation of the subject's continued significance.

Discussion between industrial arts and technology education teachers should no doubt continue in areas of instructional strategies, program definition, equipment, activities, and philosophy; for these topics are healthy for any profession. However, this discussion must include educators that represent both ends of the spectrum. Both industrial arts and technology education face similar problems relating to public perception, program legitimacy, stereotyping, and tracking of students. Greater strength may exist in seeking common ground, not continuing policies of exclusion and fragmentation.

It is hoped this examination of industrial arts reaffirms the continued strength, relevance and value of the subject. More importantly, it is also hoped the material presented serves as a catalyst for future dialog, understanding and acceptance by all educators, including technology educators. For educators to relegate industrial arts to the shadows of educational worth and reality, neglects its current status and future potential to contribute to the unique educational experience of students.\

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