Work and Education in the Eighties

monograph 9

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AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION

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Preface

The American Council on Industrial Arts Teacher Education is now in its fourth decade of existence. The decade of the 1980's may be the most critical period for the life of the teaching profession and our teacher education council. The initial years of the 1980's have been centered on economic, social, and educational problems not experienced by our society in over 40 years. The profession has been a part of the emerging development of society's educational response to these problems and our council members have contributed much insight in regard to educational, technical, and industrial literature. This ninth monograph of the council, "Work and Education in the 80's," by Dr. Donald P. Lauda, Dr. Ronald E. Jones, and Dr. John R. Wright presents important and perceptive insights in the emerging decade. The authors of this monograph are to be congratulated for this paper and the long term implications it reveals. Industrial arts teacher educators must play a major role in meeting the needs of the 1980's. Insights and understandings related to the technological development of our nation and world are essential. Assistance must be rendered in determining alternatives for, and providing understandings about, our work force, productivity, and self concepts.

It is hoped that Monograph Nine will be reviewed by individuals concerned about the educational process and how it responds to various demands of society. Educators and others unfamiliar with industrial arts need to be exposed to the discipline and its role in general education. We, who profess this discipline, must play a significant part in the development of alternatives and responses to the needs of society.

The council's Publication Committee is to be commended for approving this monograph. Much time and effort has been spent preparing it for distribution. Acknowledgement is made to these committee members for service rendered.

Inquiries regarding the monograph series should be directed to the American Industrial Arts Association, 1914 Association Drive, Reston, VA. 22091. Specific questions, comments, or suggestions relevant to the content of this monograph should be submitted to the authors.

Rollin Williams, III
President

The Evolving Concept of Work

Professional educators spend a great deal of time discussing a four letter word which is the dream of the radical majority of all humans. That word is **work**. The term has been defined and redefined through the ages and today educators continue to seek its implications for humans. The Greeks or Martin Luther are often held accountable for the concept of work; but educators cannot escape the responsibility of preparing humans to earn a living.

Work is being altered before our very eyes by two crucial and recognizable forces. These are: (1) expanding technology and (2) psychology of entitlement. Furthermore, humans will no longer tolerate an educational environment that fails to prepare them adequately for meeting their economic needs. Nor will they tolerate a work environment which does not meet their intrinsic needs.

It appears that many educators tend to define the term **work** narrowly. It is seen as a cost benefit analysis rather than a human need analysis by employers, and unfortunately, many educators. Simply put, work becomes synonomous with job. The opposite is anomie, or as economists would call it—unemployment. Historically, the term refers to a string that does not vibrate. Therefore, to be without a job is unacceptable. This narrow point of view must be questioned and an alternative view of work must be presented.

The first study of joblessness (unemployment) was done in Massachusetts in 1821. Since that time, our society has studied working people and developed plan after plan to ensure that they do not become rootless, vagrants, or burdens to the welfare roles. Most educators can easily recite recent endeavors such as: Manpower Development Training Act (1962), Equal Employment Opportunity Act (1972), Comprehensive Employment Training Act (1973), in addition to appropriated vocational funds in many other forms. These are ad hoc strategies and will continue to face uncertainty since they focus on training for the past and the present. In addition, they prepare people for holding a JOB rather than for LIFE.

Alternatives are needed in our educational system, in our business/industrial complex, and in our government. All must be responsive to expanding technology and must strive to satisfy personal needs through other activities than holding a job. Conscious attention given to these activities may not eliminate demand deficient unemployment, that is unemployment which occurs when the demand for goods and services is not as high as the productive capacity of the economy, but it most certainly can attend to structural unemployment. The concept of structural unemployment is a mid-1950 concept referring to people who do not have

skills, or who are hampered by geography, from finding work. This concept floundered in the Kennedy era when automation did not develop into a curse as expected by many. When joblessness soared in the 1970's, economists began to look for new structural barriers (e.g. high minimum wages which discouraged hiring the young and-or unskilled; more welfare, making jobs unnecessary; moves to the sunbelt). The greatest structural barrier was found to be a lack of schooling. This concept is attractive to economists and politicians since it fits nicely with human capital theory. Hence billions have been and will be spent on training (Swartz, 1980, p. 144).

Expanding Technology

There is no need to refresh the reader's memory about our expanding technology. All we have to do is look about us to see advancements. If these new technologies are not in evidence in educational programs, we can assume that contemporary students are being prepared for the past. Attention must be directed to the realities of the post-industrial revolution which characterizes our society. We have moved from a goods producing economy to a service economy. We have a pre-eminence of professional and technical workers. Today's innovation and invention process is based on theoretical knowledge creating alternatives never before thought possible. It is not surprising to learn that 60% of the total investments in 1980 went into high technology ventures (*Business Week*, 1980, p. 86).

Industrial society was based on electricity. The post-industrial society is based on electronics and computers. John Machly's invention of 1943 (ENIAC), and the advent of the transistor, has literally altered our concept of performance at a job. Quantum leaps have been made and will be made in the capacity and speed of computers. Last year the Industrial Research group gave 30% of its annual awards for the top inventions in the electronics area. The semi-conductor business is already so aggressive that even the "Big Three" auto makers have had to turn to other companies in this country and abroad for their electronic needs. Even the Delco Division now relies on Texas Instruments for some of its products.

Perhaps even more critical to our understanding of technological growth is the concept of meta-technology. This term refers to an invention which affects a large sector of existing technology. For example, the steam engine was designed to pump water from coal mines and it served that purpose for many years. Once it was coupled with mechanical devices (e.g. buggy, loom) a meta-technology was in place. The potential of meta-technology may be analogous to events in Bradford, England in 1830-31 when 10,000 hand loom weavers became paupers in two years when power looms were introduced. France and Germany had similar problems as indicated in *The Weavers*, a drama written by Nobel prize-winner Gerhart Hauptmass. Also analagous is the change in

farming. In 1700 about 80-90% of the people worked on farms to produce food. Today, this is accomplished by 3% of the population. Meta-technology makes the potential for structural unemployment very great.

Industrial productivity relies on efficiency, and automatic systems provide the answer in many cases. The rapid growth of robotics is another indication of what today's technology can do to enhance production. They may cost as much as $45,000, but over an eight-year life it will cost only $5 an hour to buy and operate, compared to $15 per hour for an employee in the auto industry (Miller, 1979, p. 149). Unfortunately for many, robots will appear in new plants in the south which are not highly unionized. Thus, assurances for job security may not be negotiable.

Many people have spent years gaining skills and these skills may be rendered useless by a single development in technology. Already many union contracts mandate that advanced warning be given when it appears that a new technology may replace workers. Today, less than 1% of the work force works on an assembly line. This figure is not surprising when we realize that providing employment is not the function of industry. Business/industry functions so long as it makes a profit. To be labor intensive detracts from the profit margin, therefore new automated systems will continue to escalate structural employment.

Today we see just the tip of the iceberg. The innovations that will be made practical in the remainder of this century will cause to become obsolete much of what is done in contemporary production of goods and services. Already such changes have altered our lifestyle by making work easier, less detrimental to health, and thereby creating a work force which demands its psychology of entitlement. The proliferation of the high technology will require innovative approaches from management. It is quite possible that before the 21st century arrives, we will see much of today's management theory rendered obsolete.

Psychology of Entitlement

Educators' pre-occupation with matching job classifications with perceived needs of humans has resulted in the great "mismatch": thousands of people have jobs where they are underemployed, unhappy, and underproductive. While the growth of technology has contributed to the development of new lifestyles, new perceptions of the "good life," and elimination of phenomenal amounts of drudgery on the job and within the home, educators still seem to focus on job titles. Such activity violates even the most rudimentary knowledge of psychology. It attends to a very low level of Maslow's heirarchy of needs.

Prior to World War II, the traditional work ethic was well ingrained in American culture. The 1950's were characterized by the "organization man" with homogeneous values, upward mobility, a reward orientation, and a willingness to get ahead even if self-denial was the price. In the 1960's, people began to seek personal significance. Since that time,

specifically in the late 1970's, workers have been demanding their psychology of entitlement. They are more inner-directed, desire self-fulfillment, and see reality being a harmonious blend of achievement and self-fulfillment. In many cases, commitments are to professions more so than to their employers. People in the labor force want psychological benefits that managers get through professional development. They are not satisfied with only being trained for a job.

Kaufman (1979, p. 272) reported that in 1973 one-third of Americans were generally satisfied with their work, but in 1979 this figure dropped to one-fourth. Workers thought that finding a job was easy in 1969 while only 20% feel that way today. More importantly, there is more apprehension about the future value of acquired job skills. In fact, one-third feel that current skills will not be useful five years from now. Specific skills are seen as less important and workers indicate a willingness to re-train if given the chance. Workers are beginning to be more conscious of the fact that business/industry has looked for fulfillment of a function rather than fulfillment of people.

O'Toole (Sheppard, 1980, p. 164) raises an interesting dilemma for our consideration. He feels that workers' expectations may rise too fast (exponentially) while our economy grows slowly (arithmetically). Increased demands for entitlement in the form of insurance, vacation, income, and other benefits have been negotiated for decades. Such entitlement mandates that management witness an increase in the quantity and quality of work. Workers do not always share this expectation. Irresponsibility can come from both sides. Workers, when seeking entitlements, initially resort to demands for minor items like better lighting, water coolers, and other physical benefits. However, once they get involved in decision-making, they get to issues which make a difference. Issues which have been resolved with success, have been those based on cooperation, trust, responsibility, and cooperation. Such responsibility must be supported by both labor and management. The challenge is to make millions of people creative, not just productive.

Productivity in this country has not made quantum leaps in the past decade. In the white collar sector, productivity increased less than 1% between 1978-1979. Increased management skills and equipment could save as much as $300 billion annually. The overall picture is somewhat bleak when compared to the success of Japan. Since World War II, Japan's productivity growth has exceeded that of the United States, France, Germany, and Italy. This success cannot be attributed solely to the fact that Japan was able to re-build after the war. In addition, the concern for people must be analyzed. The Japanese unionize by industry, not by craft. In their system workers are hired rather than millwrights or welders. Workers receive their entitlement through management's interest in the workers' lifestyles and capabilities. Individual concerns and recognitions through feedback are essential to their success.

There are many other social trends that enter the picture for all of us as taxpayers, parents, educators, and students. We must give conscious attention to:

- A declining population will reduce the reservoir of younger workers who normally choose unskilled jobs.

- The number of retirees is increasing at an alarming rate. The Social Security System cannot survive in the future with a low number of workers paying for those who no longer work. With high inflation, retirees may see their income shrink one-third between retirement at 65 and the age of 80. This could guarantee pauperism for thousands who live 25 years beyond retirement.

- More and more women will enter the work force. This long awaited and long overdue social "happening" comes at a time when the existing jobs will be in short supply. Two-thirds of all married women under the age of 55 will work for 25 years and at least one-half will have small children. This has serious implications for the child care industry and changing family roles.

- Another long over-due "happening" is the increased presence of handicapped workers in the job market. Illinois, for example, has 8% of its available work force listed as handicapped. Placing more in the work force will demand new awareness, accommodations, and changes in the educational system.

- Technology, one of the primary basis of business/industry requires phenomenal amounts of energy and natural resources. New systems which are not energy and material intensive must be found.

- Increased foreign competition will force American business/industry to seek new models for increased productivity and quality.

Re-defining the Concept of Work

If technology exists to disemploy workers, and if workers' demands will radically alter the concept of expending energy for pay, an alternative seems to be to redefine work. In a previous writing (Garner, 1975, p. 75) Lauda utilized the phrase "purposeful activity" in place of work since it can include human endeavors which have nothing to do with earning money. If to work means holding a job for pay, it follows that housepersons do no work. This is ludicrous. In the future, not holding a job could be socially accepted. Humans are said to be working animals,

in the sense that an activity of interest is essential. This does not necessarily concur with the Puritan Work Ethic.

It is time to discard the notion that you either hold a job, get married to someone who does, or be in school getting ready to be employed in order to have social respect. Today, these roles seem to be the only ones that are legitimatized. Vocational education thrives on the perpetuation of these views. Such an attitude, coupled with the realization that technology can destroy jobs, has led some people to say that we have no need in our society for the marginal worker, the very young, the very old, or the very dumb. The authors of this monograph disagree totally. There is room for everyone to be involved in some form of purposeful activity. We must legitimatize other forms of human activity. Individuals must learn to recycle themselves. This calls for a new science of inner space, a science of human rediscovery.

The Growing Need for Knowledge

The knowledge industry is the industry of the future. It is knowledge that is the major new input into modern production systems. This new knowledge creates new industries and opportunities. All forms of education, including vocational education, must focus on making people versatile, capable of change, adaptable, and creators of their own destiny rather than mere inheritors. All individuals have the right to purposeful activity and the educational system must help them to receive this entitlement.

The discipline of industrial arts is no different than any other in its responsibility. The discipline has a distinct advantage in that its primary function has always been general education. Serious introspection is needed, however, to bring it in line with the inescapable constraints and mandates of life in a technological society. This will require a quantum leap for the discipline. Indeed, such a leap by both industrial arts and vocational educators might be the first pre-requisite for providing jobs and/or work for all humans.

Extended Adolescence and Its Effects on Career Decision-making

As we continue the dialogue about work in the 80's, it is appropriate to consider the basic process of getting ready to enter the work force and the problems of career decisions faced by all high school students. Extended adolescence (a recent cultural development) will set the stage for a number of observations and possibilities for the future. So, it is appropriate to explore the concept of extended adolescence and its relationship to work and education in a highly technological society.

Adolescence, according to Hall (1916) is the period from puberty to full maturity—a time span of several years upwards to age 25 (Garrison, 1975, p. 8). This concept is not valid for all cultures or even the American culture prior to the 20th century. In fact, interest in adolescence as a separate period in one's life appears to be limited to the more developed countries.

During the 19th century in America, the transition from childhood into adulthood was very brief (Figure 1). A boy of twelve was able to work in small shops or on the farm and was considered to be an important part of

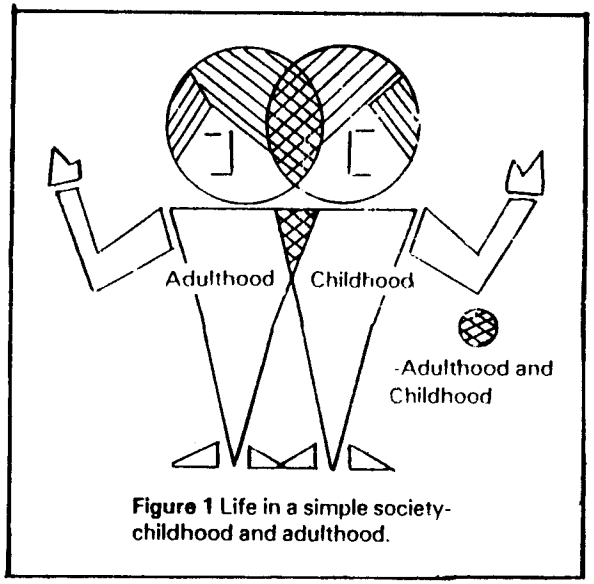


Figure 1 Life in a simple society-childhood and adulthood.

the work force. Marriage and work responsibilities occurred earlier and by the age of sixteen the 19th century adolescent was a full-fledged member of the adult community.

At the turn of the century, America began to industrialize and humanize. Child labor laws and emphasis on schooling began to keep the younger child from entering the work force until the age of sixteen. ". . . Twentieth century advanced technology and rapid social change make it necessary for young people to stay in school longer and remain dependent financially and psychologically on their parents. Clark (1957) has called this extended period of waiting for adult roles *vestibule adolescence.* ." (Craig, 1979, p. 7).

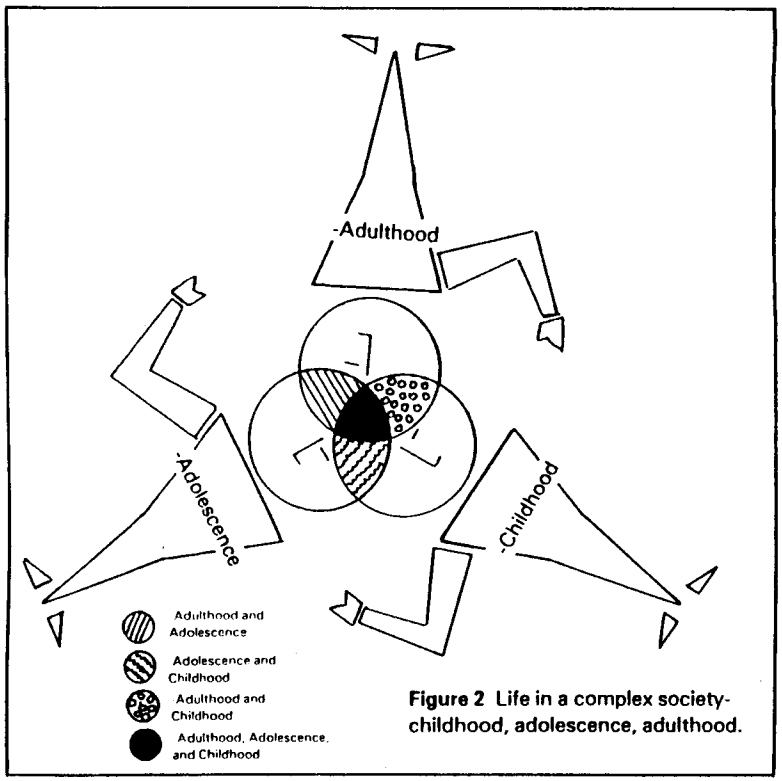


Figure 2 Life in a complex society-childhood, adolescence, adulthood.

Vestibule or extended adolescence has continued to grow during the 20th century to the point where the period of adolescence is expected to last throughout the teens and even into the early twenties. In other words, we have extended the period of time from childhood to adulthood. In 1875, the transition took from one to four years, and in 1980 covers from one to 13 years. As noted in Figure 2, the trend of extending adolescence has

continued during recent years and has verified Hall's original theory that adolescence is a product of advanced Western industrialized societies. (Garrison, 1975, p. 8). This concept is significantly reinforced by major advancements in two important areas:

- Industrial technology
- Medical technology

Industrial Technology

Modern industry and technology demand that people entering the work force must have a higher degree of technical skill and knowledge. In addition to technical skills, the worker in the future must develop problem solving skills and learn to cope with flexibility.

The age of automation and cybernetics has created the need for flexibility in occupational preparation. "More than half the nation's economic activity will center on industries that provide services rather than products." (Service industries. . ., 1980, p. 80). Skill occupations based on industrial material processing will give way to processing through technical robotics and computer controlled guidance systems. "Industry is looking for more computer, financial and other business specialists, but less demand for assembly line workers," (Ibid, 1980, p. 80).

Where Service Jobs Will Grow in Years Ahead...

	Jobs Forecast in 1990	Percent Change From 1979
Water, sanitary services	163,000	Up 123
Automobile repair	1,137,000	Up 100
Medical, dental ofices	1,882,000	Up 81
Hotels, lodging places	1,747,000	Up 72
Nonprofit organizations	2,673,000	Up 66
Hospitals	4,307,000	Up 60
Credit, finance agencies	1,167,000	Up 51
Advertising	219,000	Up 45
Retail trade	21,482,000	Up 43
Amusements, recreation services	1,010,000	Up 42
Banking	2,054,000	Up 36
Transportation services	252,000	Up 31
Radio, T.V. broadcasting	252,000	Up 27
Insurance	2,117,000	Up 25
Real estate	1,358,000	Up 19
Airlines	511,000	Up 18
Motion pictures	239,000	Up 14
Trucking	1,587,000	Up 13
Wholesale trade	5,888,000	Up 12
Communications, except radio and television	1,221,000	Up 8
Electric utilities	522,000	Up 4

...And Where They Will Decline

	Jobs Forecast in 1990	Percent Change From 1979
Pipelines	17,000	Down 11
Waterways	192,000	Down 16
Railroads	450,000	Down 18
Gas utilities	168,000	Down 39

U.S. News and World Report, 1980

> One of the economic problems of a high-technology society is that on the one hand, it demands highly specialized, frequently non-transferable skills, whereas on the other hand, it also generates rapid shifts in technology and in the economy generally that may make these skills obsolete in a relatively short period of time. (Conger, 1977, p. 454).

Many educators in the technical areas are beginning to stress more humanistic models of education which delay specialization until the general education has been completed. Supporters of this approach stress career awareness and technological literacy with problem solving experiences that can provide a base for flexibility. (Wright, 1980, pp. 35-38).

"Automation demands more highly educated, not just highly trained, workers. Rapid change makes it necessary that today's adolescents be educated for several shifts in occupations during their lifetimes." (Bernard, 1975, p. 268). The continued development of a highly technological society will tend to extend the adolescence period and provide a larger and more complex generation gap of disenchanted and alienated youth. All this adds to the dilemma of the adolescent who seeks independence and desires to enter the work force at an earlier age.

Medical Technology

Adding to the complex problem of more technical occupational demands, our society may also begin to see adults remain in the work force for a longer period of time. The idea of a two-career life becomes increasingly more attractive to senior citizens who are in better health (thanks to modern medical technology) and can expect to live longer. As they prolong their career life expectancy, the adolescent is precluded again from entering the work force. In fact, the second career choice of an adult may be the same jobs held by adolescents in the service industries (i.e. service station attendants, food chain help, janitorial work, etc.).

The question may now be raised about what options are available for young people who wish to enter the work force and begin the career process. They can become dropouts and compete (with senior citizens) for the non-technical or professional occupations, or they can stay in school for a longer period of time. The problem of career decision-making is difficult and complex for the young adolescent, and the consequences of a poor decision are far-reaching.

Vocational Maturity

According to Crites, "Approximately 30% of high school seniors are undecided about what they want to do; a similar percentage are unrealistic in their choices," (Westbrook, 1969, p. 75). This reveals that a whopping 60% of the 18 year-olds are leaving our schools without realistic career goals. In addition to these data, Bingham has disclosed that students with learning disabilities (L.D.) score lower on the Career Maturity Index aptitude scale, an area of concern Crites considered to be very important for career decision-making. (Bingham, 1980, p. 136).

Having a vocational objective is considered to be very important in a society which has a strong work ethic. Although work patterns and career opportunities may be changing in a technological society, the process of choosing a career will remain as one of the most important decisions for the adolescent. Ginsberg has suggested that an occupational choice is a compromise between fantasy and reality. The individual is seen as

moving through three definite stages in the process of making a vocational choice:

- Fantasy period
- Tentative period
- Realistic period (Lambert, et. al, 1972, 0. 269)

The first stage of fantasy is related to desires and dreams. The adolescent may wish to be a chemist one day and a truck driver the next. Qualifications, education, or job skills are not important in the fantasy period. The second stage (tentative) is marked by an interest in educational requirements, salary, personal values, goals, and personal aptitude toward the work. The period of reality begins around age 17 and resolves the problem of choices and becomes the compromise of fantasy with reality.

> Vocational development is one aspect of the many-faceted development of the individual. Basically, the individual does not choose an occupation, but rather makes a series of occupational and occupationally related choices at different life stages which, when taken cumulatively, result in vocational development rather than in occupational choice, per se. Occupational choice does not occur at a given point in life; vocational development emerges over a long period of time as the individual pursues vocational and vocationally related goals (Zaccaria, 1970, p. 37).

In fact, vocational development occurs throughout one's professional lifetime as indicated by Super's 1957 vocational development theory. (Garrison, 1975, p. 8) (See Figure 4.) Super's theory appears to be well supported in recent literature with the exception of the ability of students to assess careers during the capacity stage.

O'Hare and Tiedeman have indicated that after the interest stage, a work-values stage continues until grade 12. However, they caution that "Aptitude (i.e., the subject's capacity for objectively assessing his own capabilities) is relatively poorly perceived throughout grades nine through 12 even by academically able boys." (Conger, 1977, p. 425). As the adolescent grows older, he or she is influenced by peers, social status and prestige in the adult world.

> In general, ". . . the older the adolescent, the less changeable the vocational interests become (as measured by vocational interests tests repeated after a given interval of time). By middle adolescence, vocational interest has become fairly stable, though changes may still occur. By age 25, complete stability is usually achieved." (Conger, 1977, p. 425.)

Stages of Vocational Development in Super's (1957) Theory

1. Growth Stage (Birth to 14 years):	A period of general physical and mental growth.
A. Prevocational Substage (Birth to 3):	No interest or concern with vocations or vocational choice.
B. Fantasy Substage (4-10:	Fantasy is basis of vocational thinking.
C. Interest Substage (11-12):	Vocational thought is based on the individual's likes and dislikes.
D. Capacity Substage (13-14):	Ability becomes the basis for vocational thought.
2. Exploration Stage (15 to 24):	General exploration of work.
A. Tentative Substage (15-17):	Needs, interest, capacities, values, and opportunities become basis for tentative occupational decisions.
B. Transition Substage (18-21):	Reality increasingly becomes a basis for vocational thought and action.
C. Trial Substage (22-24):	First trial job is entered after the individual has made an initial vocational commitment.
3. Establishment Stage (25 to 44):	The individual seeks to enter a permanent occupation.
A. Trial (25-30):	A period of some occupational changes due to unsatisfactory choices.
B. Stabilization (31-44):	A period of stable work in a given occupational field.
4. Maintenance Stage (45 to 65 yrs):	Continuation in one's chosen occupation.
5. Decline Stage (65 yrs to death):	
A. Deceleration (65-70 yrs):	A period of declining vocational activity:
B. Retirement (71 on):	A cessation of vocational activity.

(Garrison, 1975, p. 8)

Figure 4

Pre-Vocational Education

One may consider that all educational preparation prior to vocational or professional education has a pre-vocational goal. This concept could break down into two major classifications at the high school level, those students interested in:

GENERAL PREPARATION — or — COLLEGE PREPARATION

Students are introduced to the math, science, and composition requirements in a college prep program in an effort to get students ready for a college experience. Very few, if any, experiences are provided for "exploring" or "trying out" the professional occupations. In fact, the only decision necessary for the pre-vocational experience in the college prep program is the decision to "go to college."

On the other side of the spectrum is the general preparation program where students are expected to take some math, science, and composition and are also introduced to such areas as home economics, business education, industrial arts, distributive education, etc. These areas usually provide practical experiences with opportunities for "hands-on" job-related skills. However, students in this group do not have the luxury of waiting until the end of the senior year to make a career decision, instead they are asked to identify:

- at grade nine: college or non-college.
- at grade ten: (in most states) an occupational area of concentration.

If the trend and published professional psychologists agree that extended adolescence in advanced western societies is happening and will continue to grow, and that career decision-making is very complex and difficult for the adolescent, then why the hurry? Why ask the general preparation student to make a career decision before the college prep student? And why don't we set funded vocational education programs to begin at grade level 13?

We don't know!

The standard trade classifications are getting more complicated each year. Today's technical work force needs far more math, science, and communication skills than in the past. The fact that these areas are watered down in the general curriculum as compared to the college prep curriculum becomes a career limiting factor for the student who may wish to enter college eventually.

In addition, the literature indicates that the more occupational and personal information the student knows about himself or herself, the greater the opportunity they have for a wise career decision.

Vocational Education

An increasingly complex technological society needs a flexible vocational educational program to provide technical experts to manage and use technology. American vocational education has been providing the necessary quality technical work force for our increasing in-

dustrialization since 1917. The mission for vocational education is clear and perhaps even more important as our society moves from a goods-producing economy to a goods-servicing economy.

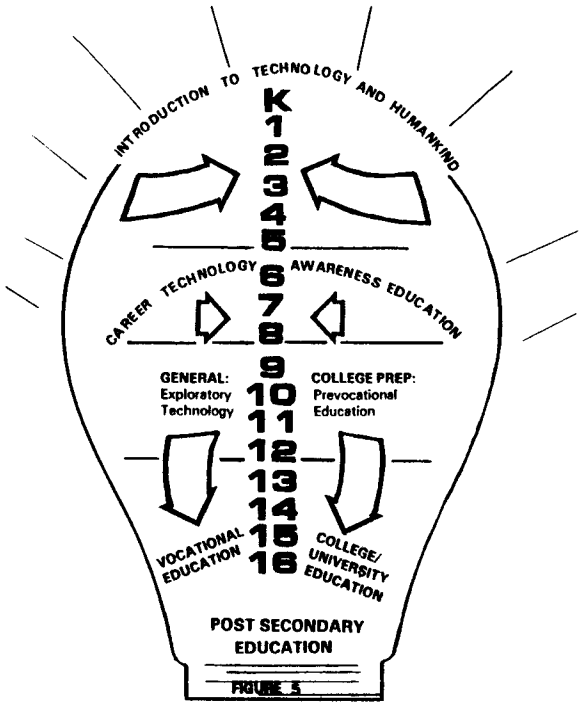
As technical knowledge increases, the educational needs of adolescents are extended. By nature, an electronic/technical society has a strong math/science orientation which is more demanding than the craft/industrial mechanical systems of yesterday. In addition, career decisions are much more complicated and occur (because of extended adolescence) at a later age than in the past. Perhaps then, a reorganization of the scope and sequence pattern for vocational education is in order. Vocational education should become a post-secondary endeavor. Such a change would have several implications for technical education:

> Pre-vocational technical courses could be funded in grades 7-12 that provide career information and an understanding of how our technological society functions.
>
> Part-time work under close supervision through programs such as Distributive Education, Diversified Occupations and Cooperative Education can also add meaningful experiences prior to the career decision. (Lambert et al 1972, p. 262.)

Such programs should be part of the general secondary education program with special provisions for the exceptional child. Areas such as home economics, industrial arts, business education, and health education can readily provide rich experiences for pre-vocational/technology education.

Area vocational centers and the technical programs in community colleges could be reorganized into a post-secondary four-year vocational program funded by the Smith-Hughes Act. Reasonable success could be realized because of better prepared students entering the system (from a grade 7th-12th pre-vocational experience) and more mature and secure students (age 22) would graduate and enter the world of work. This factor could also result in sustained employment trends over a period of time.

By moving the vocational education experience into a post-secondary endeavor, (Figure 5) students in high school could spend more time in general subject areas with career and occupational experience. They could also explore the world of technology through laboratory experiences which could enhance their cognitive and psychomotor skills. Such pre-vocational experiences could help students make more mature and rational career decisions, as well as help them become better consumers and decision makers about the use and control of technology.



This figure implies that a pre-vocational/technology education prep program is needed at the secondary level if vocational education becomes a post-secondary endeavor.

Conclusion

Career decision-making and vocational maturity tend to occur towards the latter part of the period known as adolescence. In a highly technological society, adolescence is extended and young people are kept out of the work force longer. In addition, technology has extended the life and working span of many individuals in the work force for a longer period of time.

Considering the complexity of our technological society, we could begin to take advantage of the extended adolescent period by emphasizing more career/technology awareness at the primary and secondary level. A new structure should be developed for the technical professionals of the future by reorganizing the vocational education program and providing its services as a funded post-secondary educational opportunity.

As the world moves forward industrially and technologically, we should support the growth with increased technical education. We are at another threshold in history and the time may be right for vocational education to reorganize into a new model which could meet future needs of our nation's adolescents more effectively.

Factors Affecting the Career Decisions of Adolescents

Many factors will affect the career decision-making ability of adolescents in the future. Among these are the potential changes in young members of society through extended adolescence plus redefining such concepts as work and leisure. Although there are numerous factors related to career decisions, the authors are concerned with those that will provide both immediate and long-range impact. Specifically, these are the student's working environment in the public schools and the public school teacher.

If we agree changes are needed that will help adolescents with their career decisions, then we need to focus our attention on these two factors. First, changing the student's working environment in public school classrooms and laboratories can have an immediate affect on their career decisions by providing broader-based pre-vocational experiences, i.e., at the 9th-12th grade level. Second, subsequent change in undergraduate teacher education programs to adopt a technological base as opposed to an industrial or crafts oriented base will provide the necessary sustained long-range impact.

Student's Working Environment in the Public Schools

Why will changing facilities affect the career decision-making ability of the adolescent in the 80's and what is the alternative to traditional facility design?

Traditional facility design, that is, the unit laboratory or shop containing only woodworking equipment, metal working equipment, or graphic arts equipment has hampered the process of change. Often, curriculum has been developed around the existing placement of equipment in the facility with little or no thought given to possible reorganization. It should be apparent that curriculum planning cannot be determined by such things as the location of an electrical outlet. After well planned education objectives have been identified, then the facility, equipment, and all other ancillary materials should be considered in the curriculum plan.

With the current economic trends and projected decreasing enrollments, there is relatively little chance of obtaining funds for constructing new facilities. In addition, funding may not be available for major renovations of existing facilities. Therefore existing facilities, e.g., the building, walls, and plumbing, among others may remain permanent without major change.

Although this situation is a definite constraint while writing the curriculum, it cannot be the primary consideration. Curriculum planners must continue to work from a base of educational objectives. Obviously, permanent facilities will have to be considered, but a significant compromise of the curriculum to fit existing facilities is simply not necessary.

As teacher educators, we must be cognizant of changes in our technical world and incorporate them into the existing curriculum. Therefore, physical facilities should be planned to accommodate future change since we will continue to need facilities. DeVore (1976) has indicated that "unit laboratories must give way to open-spaced concepts which allow for flexibility in a variety of learning situations." (p. 152) Bender (1978) expands this concept to include not only flexibility, but also adaptability. Bender defines adaptability as ". . . the ease with which spaces designed for a given function can be transformed to accommodate changes in methodology, instructional equipment, content, and the like." He defines flexibility as ". . . the change quality of a physical facility which permits variation in the learning activities, scheduling, class size. . . ". (p. 5)

These two criteria; flexibility and adaptability, should be considered during facility design. There is no real need for permanence in equipment placement. Programs now exist where precision equipment is moved each time a production run is completed without damage to the equipment.

The need for non-permanence in industrial arts facilities is apparent during a major curriculum change and if the existing curriculum is to remain contemporary. The need for flexible facilities was brought to light during many attempts to develop a national curriculum during the 50's and 60's. Maley (1979), while attempting to introduce the Maryland plan, stated that "Some rearrangement of laboratories to provide the necessary kinds of (learning) environment was needed. . ." (p. 140). Lux (1979) adds credence to this idea in his statement concerning the Industrial Arts Curriculum Project when he indicated that here is a ". . . Lack of appropriate laboratories, facilities and equipment . . . . Flexible, industry-like laboratories were the exception." (p. 155).

Students will need technical skills in the 1980's and 90's just as much as they did in the 1950's and 60's. In order to teach these skills, we must provide students with working environments that will promote learning and, as near as possible, emulate the real world in order to provide a sound basis for their career decisions.

Typically, students may not have the opportunity to actually experience on-the-job many of the occupations available to them. When they attempt to obtain work, they are often given menial tasks such as dishwashing, pumping gas, or performing custodial functions. Opportunities to experience occupations such as engineering, quality control, or marketing are rare. Assuming that a cooperative program is

not available, students could benefit greatly from the opportunity to simulate industry and industrial occupations by organizing an enterprise and producing a product.

Those of us in teacher education should emphasize the importance of the working environment to our undergraduates. We must never allow facilities to be eliminated if we believe that skill development is an important part of our curriculum. Facilities are expensive and time consuming to maintain, but this aspect of our discipline, the tools and materials, make us unique and able to stand apart from other educational programs. Finally, it is the "tools and materials" aspect of the program that can initially interest students.

Facilities have traditionally been designed and named around specific processes (welding, printing) or specific materials (woods, metals). Facilities of this nature can only provide the student with an extremely limited view of perhaps one or two different occupations. This situation is fine in the vocational areas at the post-secondary level. However, it only serves to limit the students' knowledge concerning career choices while they are in the 9th-12th grades.

Utilizing large, open facilities designed in a manner that will simulate industry and the "real world" should provide students with a broader range of knowledge on which to base their career decisions. Flexible facilities in which equipment placement is not considered permanent will actually enhance the curriculum planning by allowing a larger number of content options.

Some advantages of the flexible space design become readily apparent if one considers welding as an example. Students learn to weld in the welding shop. Although they may learn different types of welding (arc, gas, MIG, etc.,) the information obtained in this class concerning future career decisions is limited. Perhaps only two or three career choices are apparent to the students if careers are discussed at all!

Using the same example, a better method of providing a broader range of pre-vocational experiences would be to plan the curriculum and facilities around the concept of Metal Fabrication. While fabrication deals with the manufacture of a product, welding is simply a process of fastening used in metal fabrication. The process of welding should continue to be taught as a part of the course content. However, the emphasis should be placed on manufacturing or constructing a given product or item.

Finally, planning the curriculum and changing the facilities to accommodate a variety of processes within a given course should provide students with a much broader range of experiences and a "look" at careers available to them in the future. Therefore, students should be able to make more intelligent career decisions concerning the need for additional training or education. After all, isn't this one of the goals of vocational education at the post-secondary level?

Undergraduate Teacher Education Programs

One of the effects on the career decision-making ability of adolescents in the 80's will be the training each teacher receives. Sociologists have determined that decision-making is influenced by peer pressure, parental pressures and the counselor-teacher influence. Conger states that "Probably the single most important situational factor affecting the school adjustment and progress of the average student is the teacher-pupil relationship." (1977, p. 370.) Requiring a teacher education major to complete projects such as sheetmetal boxes and hand-setting type will insure the continuation of these projects in the public school.

We cannot afford to continue doing these kinds of craft-related activities either at the university level or in the public school if we are to remain viable as a recognized descipline and meet the career needs of our students. This is exemplified by the following statement.

> There were four high schools in the district, two had woods and two had metals classes. Industrial arts teachers were difficult to find and nobody considered the classes very important, so they just shut down the IA program and sold the equipment. (Rider, Note 1.)

It is difficult to justify pump handle lamps, breadboards, and tool boxes in our public school programs. These projects are simply not important and do not contribute to the general education or even the vocational education of the student that is going to graduate and enter an extremely sophisticated society. In addition, attempts to provide a relationship between such handcrafted projects and career information often fail. The obvious result is to keep the project and eliminate the career information.

In his article, "A Historical Look at Industrial Arts Education Through a Founder: Frederick Gordon Bonser," McPherson (1979) quotes Bonser's 1913 statement: ". . . Curriculum of the School should represent the needs and interests of present day life in our own immediate environment and the world at large, the social factor." (p. 20.) Do our educational programs deserve a different emphasis today? Of course not! To continue programs that promote and incorporate craft projects is an inappropriate use of tax dollars. This money would be better off put to use expanding other aspects of the general curriculum such as English, math, and science.

Undergraduate teacher education majors must realize they are going to deal with a highly sophisticated student in the future. It is the responsibility of teacher education to provide the rationale, impetus, and direction for change in undergraduate programs and subsequently in public schools. "Traditionally, industrial arts has been pretty much what the individual teachers have said it was. They have been influenced by teachers of teachers and by textbook authors and publishers. . . . but when the shop door closed, the teacher defines what went on behind the door." (Evans, 1979, p. 8). While we are preparing teachers for the

special "world of work," are we providing them a disservice through antiquated programs and requiring shop projects that are not more than just craft items?

An alternative to the traditional undergraduate teacher education programs emphasizing craft or industry-based curricula is a technology-based program that would encompass virtually all of the positive features of existing curricula plus the addition of new information regarding technological phenomena. A program of this nature would provide students with an opportunity to study the recognized "systems" individually and the interrelationships between them. In addition, the program provides a logical sequencing of courses with each subsequent course building on the previous one with additional technical and/or technological content. Initially, the concept of technology would be introduced and the systems would be identified. Next, students would study each of the individual systems. Finally, the interrelationships between the system could be emphasized in a final, culminating experience.

Upon completion of the program, students should be technically competent, i.e., they should have the necessary skills to operate the various equipment used in our discipline. Next, they should understand "technology" and it's implications on the environment and society. The addition of the general education core and the professional sequence would complete the program of study.

The students, in turn, become public school teachers. Preparation for this transformation takes approximately four years. The actual transformation from student to certified teacher takes only a few minutes.
This teacher must be prepared to deal with a highly sophisticated public school student when compared to previous generations. Teachers must provide public school students with information and a working facility that reflects contemporary thinking, and as closely as possible, simulates the "real world."

Career Decision-Making: What Now?

We have presented two specific factors that have a distinct effect on the career decisions of adolescents. Whether students are enrolled in Industrial Arts, Industrial Education, Vocational Education, or Technology Education is really not important. What is important is that the content of program must provide students with the information and skills to make intelligent career decisions. We should continue to use the public schools for the general education of students, de-emphasizing vocational skills at an early age and re-emphasizing basic education so that students will become more knowledgeable citizens in our technological society.

We should continue to use the public school as the vehicle for career awareness. We need to include this information in our programs to insure that students can make intelligent career decisions concerning the need

for additional vocational training or academic preparation for entry into a profession. We should also provide the opportunity for high school students to experience various occupations through cooperative programs, internships, and visitations into the "real world." Finally, we can strive to simulate this "real world" in our classrooms and laboratories.

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